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ANNUAL ORATION

MEDICAL CARE IN OUR FREE SOCIETY*

LELAND S. McKITTRICK, M.D.†

BOSTON

The objective of adequate medical care in our free society is to make available to everyone — regardless of race, color, creed, financial status or place of residence — every known essential preventive, diagnostic and curative medical service of high quality. The attainment of such medical care must necessarily be an evolutionary process which will require the co-operation of all concerned over a period of years.[1]

I have chosen as the subject of my oration this paragraph from the *Basic Principles Which Should Govern Medical-Care Plans*, which the Massachusetts Medical Society presented last year. Concise and complete, it stands as a challenge, if not a commitment, to us as members.

Available to Everyone Regardless of Financial Status.

Financial status as applied to medical care is a relative term. To the head of a household, modest but sound, the cost of an appendectomy for one of the children may be met without undue hardship. Should the head of this household suffer a long and serious illness, the unavoidable financial obligations assumed may represent a burden that not only is a hardship but also may be overwhelming.

A consideration of the availability of medical care to the people of this Commonwealth must include a study of the income of the prospective recipients as well as of the cost of the services rendered. Interested in and busy with the calls of our patients, few of us have given thought to the earnings of the people of the Commonwealth that we as a profession serve.

It has been with much greater difficulty than would have been anticipated that information was obtained that might give us some reasonably accurate data on the relative number of workers in this state who fell into the different income classes.

Figure 1 is based on data compiled by the United States Treasury Department.‡

Whereas wages in 1942 were at a lower level than those of the present, the wage earners' income was probably higher because of overtime and other incentives used to increase production. To me, this is an impressive picture. It must be kept constantly in mind as we discuss the problem of a program that will make good medical care available to all the people of the Commonwealth.

Good medical care is and will remain expensive, but the continued rising costs of this care are a concern to us all. Yet there must be a ceiling to such costs, or else they cannot continue to be met by too large a segment of our population, and the price put on good health will be out of proportion to that on other necessities and privileges of our daily life.

As one might expect, most of the increasing costs are in hospital and nursing care. Thus, in 1940 the average total per-diem hospital charge, exclusive of professional and special nursing care, to 100 patients in the lowest price accommodation at the Baker Memorial Hospital was $7.31, and in 1947 this same care cost the patient $13.40 daily, or $93.80 per week.

What are the factors responsible for this, and how are they being met? The financial problems of the voluntary hospitals were presented in a forceful and realistic way by Dr. Faxon[2] in his address at the Ether-Day Exercises last October. Two months later, the Hospital Council of Boston, after careful deliberation, recommended that the hospitals of the Greater Boston area adopt a pay-as-you-go philosophy for meeting rising costs and diminishing voluntary contributions. Specifically, the Council recommended that in the near future hospital rates be

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†Associate in surgery, Harvard Medical School; surgeon-in-chief, Palmer Memorial Hospital; surgeon, New England Deaconess Hospital; visiting surgeon, Massachusetts General Hospital.

‡The basis of the data is Table 8, which presents individual returns with net income for 1942 by taxable and nontaxable returns and by net income classes, and also aggregates, by states, for individual returns with no net income and for taxable fiduciary returns with net income.

established at such a level that they would approximate the cost of hospital care and suggested that in this community a rate of $8 a day plus extras, or a total of about $11 per day, be established as the minimum ward rate, with the understanding that those unable to pay the established rate be admitted as before for whatever they could pay. These rates were promptly accepted by most of the hospitals in the Boston area. If special nursing and professional fees are added to the $11 or more a day and it is considered that in 1942, when earnings

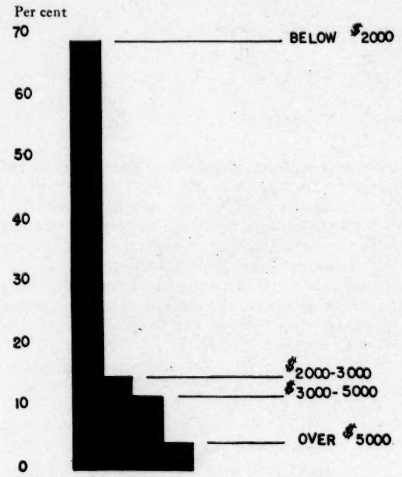

FIGURE 1. *Net Incomes by Classes for Massachusetts*, 1942 (*from* Statistics of Income for 1942, *compiled by United States Treasury Department*).

were up, 69 per cent of the wage earners of Massachusetts had a net income of $2000 or less and 84 per cent received less than $3000 a year, it becomes at once obvious that the phrase "regardless of financial status" assumes real significance.

Let us for a moment consider the present high cost of hospital care. This is highest in our large teaching hospitals largely because of the overhead associated with research and other activities intimately tied up with medical advances and the teaching program. To eliminate these activities is to strike at the soul of good teaching and medical progress and is not to be considered. Still this is extremely costly. How can these institutions continue to meet the costs? Surely not by raising the charges for hospital service to the relatively few private patients cared for in these hospitals; nor should the same patients be expected to pay for it indirectly by having a portion of the professional fees used for this purpose. The results of these investigations benefit all prospective patients, not only in the hospitals in which the work is done but also in and out of all hospitals everywhere. The organization and execution of this work is the responsibility of teaching hospitals with adequate and well organized personnel and physical facilities. The financial responsibility in the past has been almost wholly assumed by private benefactors. Ideal as it is, this source is uncertain and is becoming more and more limited. Additional, more dependable sources (including federal funds) must be and are being sought and obtained. Although such money may well be given for a specific project, these grants should and must be complete and free from all obligations — moral or otherwise. At the same time, it is incumbent on these institutions to review their organizations and to be in a position to assure prospective donors that money so received is being used with the greatest possible efficiency — lest too much of what is available go into reduplication of effort, disorganized investigation and ill conceived and overlapping laboratory expenditures. Research well organized and efficiently done must continue to develop for the benefit but not at the expense of the sick patient alone.

Patient care, on the other hand, is the responsibility of the persons requiring hospital care and of the communities in which they live. If this is true and if in the future our voluntary private hospitals are to be supported by those who use them, is it not proper to ask whether or not our present hospital services are economical, efficient and a pattern to follow in future planning? In other words, what are the responsibilities of the hospital to the patients it accepts and now charges full payment for services rendered? Where do special nurses at $25 or more a day fit into a program of such hospital care? Should they continue to be desirable for most patients undergoing routine major operations, even though in many of these cases their value to the patient and to the surgeon is in the constant attention to simple details in contrast to the experience, training and skill essential to the care of the more complicated conditions and the critically ill patients? Should special-duty nurses, as we now know them, offer a purely luxury service, except in cases in which they are assigned and paid for by the hospital to give the complete coverage that is necessary for the more seriously ill patients? Has not the time come when our concept of hospital service to the patients in semiprivate and ward accommodations requires careful and thorough revision and the adoption of a long-range program that will spread the cost of this care, regardless of the amount involved, over all patients entering the hospital?

The present shortage of nursing care is not pertinent to this discussion. It is here today as it was after the last war, and there is no immediate solution to it. We shall continue to live from hand to

mouth until there is stabilization of all labor at a more nearly normal level. We are greatly concerned, however, over the increasing demands for and the rising costs of nursing and over how these are to be met in the future. There must be and there is a solution to these needs, which can and will be worked out by a carefully planned and executed program and which has as its incentive one objective — the welfare of the patient rather than the continuation or extension of any existing patterns. Thus, there is much reason to believe that the present three years' training program leading to the R.N. degree is unnecessarily long and costly for preparing a young woman to carry out a large segment of bedside care, and that it is not adequate to develop a truly professional teaching and supervising personnel of high quality. Some breakdown, then, of our present concept of nursing care may be necessary. Just what pattern shall be followed may well depend on such experiments as are being carried out at present at the Massachusetts General Hospital, where a group of "earn-as-you-learn" hospital aids are being used under careful supervision for the routine bedside care of patients on two of the surgical wards. Possibly, as has been suggested, we should have three groups involved in our hospital nursing services: first and probably largest, young women and men trained for relatively short periods — probably not to exceed one year — to carry the burden of routine bedside care; secondly, young women and men with an adequate but not overscientific background, trained to care for the more complicated and critically ill patients — a training that quite possibly might be condensed into less than the present three-year period; and finally, a group of truly professionally minded and trained young women, whose responsibilities will be the supervision of our wards, the development of nursing programs and the teaching of the nursing personnel at all levels.

It is believed by many that 60 per cent or more of bedside nursing can be done by young women and men with the relatively short period of training. Whereas the more complicated operations such as those on the thoracic viscera and the brain are being done in increasing numbers and require constant and skilled nursing, the care of routine general surgical patients (and, I suspect, of medical patients too) has been simplified, not complicated, by recent developments. What so many of these patients need for a few days is attention, not complicated professional care. If this is true and if, as many experienced physicians believe, the bulk of routine patient care can be done by young women after short periods of training, is it not conceivable that by lowering the over-all cost of caring for the uncomplicated hospital patients and increasing the coverage given to those critically ill, a concept of hospital care could be developed, the cost of which to the individual would be well below that of the present plan if one includes the almost routine use of special-duty nurses, when they are available, in the early days following operation? But whatever method may be developed, surely at least a part of the high cost of hospital care must be met by a changing concept of what hospital service means to the patient seeking and paying for it.

An important, if not the most important, factor in the development and final success of any plan conceived and adopted by hospitals for the more efficient and less costly care of sick patients will depend on the interest and co-operation of the medical profession. Who, for example, shall decide whether a patient requires special attention or not? Surely not the hospital administration alone. You, the physician, better than anybody else know the condition of each patient, and extra services to those patients (exclusive of the luxury group) must be determined not on the wishes of patients or their families but on the condition of those patients in relation to the routine service that your hospital is able to give. Therefore, with the changing concept of what is best and most efficient for the care of our patients, let us take an active, aggressive and co-operative part in the development and execution of any constructive program that our hospitals may choose to establish.

Better routine care to the uncomplicated case with complete care to the seriously ill at the lowest possible cost that is spread among all patients entering the hospital in ward and semiprivate beds is, I believe, the objective toward which we should work.

But more inclusive and complete hospital service at the established rate is but a part of the answer. The over-all cost of good medical care will always be high, — too high for 84 per cent of the people of this Commonwealth to pay for out of pocket when the ax falls, — and it would be unfortunate indeed if any member of this Society failed to accept this as an integral part of his basic thinking. When you have accepted this, the inevitable question of compulsory versus voluntary coverage follows. There never has been and there is now no controversy between most of the proponents of the two methods over the objective, but there is complete divergence of opinion concerning the method by which that objective can most satisfactorily be reached. No one of you, nor I, nor anyone at this time has the vision to look into the future and say, "This or that is *the* method of paying for and distributing to the people of this country the highest possible quality of medical care." Whether we have voluntary or compulsory insurance will not of necessity depend on which is the better method but rather on what the people want. What the people want will depend on what proponents of a given method tell them as compared to how we as physicians lead and serve them. The proponents of compulsory insurance are now devoid of any favorable comparison. Medicine in England and Germany long ago ceased to favor it. Selective Service

statistics have been debunked. The United States Public Health Service, long cited as a Government agency efficiently run and free from any political pressure, fell from grace when each of its officers, including those in the Reserve, was instructed by the Surgeon General of the Service[3] to familiarize himself with the President's message (September 6, 1945) and to be guided by its provisions in any "public statement likely to be interpreted as representing the official views of the Public Health Service." And the public school, so often referred to as representing a form of taxation effectively returned to the people as public education, is no longer pointed to as an example of the efficiency and flexibility with which Government meets changing economic conditions. Devoid, then, of examples, the proponents must depend on theory, organization, propaganda and promises. But do not underestimate the logic of compulsory health insurance. In theory, on paper or over the air, it has everything. You and I, as practicing physicians, know that the problem is anything but as simple as Mr. Falk, Senator Pepper and others would have us believe. Not only do we as a group deliver to the people of this Commonwealth the greater part of their medical care, but also we, better than anyone else, know the problems. We know what keeps us on telephone call and what gets us out in the middle of the night, as well as what the people want, need and have a right to expect of their doctor. If this is true, should it not be possible for us to do our job as physicians and, in addition, to convince the people we serve, not only by valid argument but also by the effectiveness and sincerity of our efforts in their behalf? Are we not, by example, in a better position to reach the people of our community than those who must depend on words and promises alone?

We can be grateful to the Council of the Society for its wisdom and foresight in setting up the medical-care program as expressed through the Blue Shield. It is gratifying to learn that two million, or 50 per cent, of the residents of Massachusetts are now enrolled in Blue Cross and that Blue Shield had increased its membership by 108 per cent from January 1, 1946, to January 1, 1947. Both are to be congratulated on their rapid growth and their new comprehensive plans, effective on June 1, 1947; whereas there are some controversial points in the new Blue Cross coverage, these can and will be satisfactorily adjusted. It might not be amiss, however, to remind the directors of these services that they are a necessity for 84 per cent of the wage earners of this Commonwealth, but only a convenience to the remaining 16 per cent, and that any pressure from or desire to increase the appeal to the latter must not result in excessive cost to those they have been created to serve. These services must continue to grow and develop. Unless we as physicians have constantly before us the best interests of the people of Massachusetts and do our utmost individually and collectively to make possible better and better care through individual efforts and an aggressive, co-operative medical-care program, we shall have failed not only in our duty but also in our opportunity. The time is past when any but the well-to-do can pay for a serious hospital illness when or after sickness occurs. Prepayment for hospital and medical care for the people of this Commonwealth is here to remain. Whether it continues to expand and progress and to develop on a voluntary basis with its many possibilities or whether it is ultimately placed on a compulsory basis with its inefficiency and governmental regulation is up to us.

Regardless of Financial Status.

There is a large group in this, as in every state, who can pay for little or no part of its medical care. It will vary in size, depending on economic conditions and other factors. This is a large and an important group, and provision for its care is, according to our principles, the responsibility of the local or state government with the help of charitable agencies and if necessary federal grants-in-aid to state programs. Many are honest, frugal people who pay their normal way but have no savings or no prospects for meeting abnormal expenses. Others have never met and will never meet any obligations. A medical-care program that does not include this group is not complete and will not permanently survive.

Every Known Essential Preventive Diagnostic and Curative Medical Service of High Quality.

Prevention of disease is the first fundamental of good medical care. The Commonwealth is favored with a public-health department of unusually high quality. To Massachusetts in 1869 went the honor of establishing the first state department of health in this country. In spite of its seventy-eight years of progress and its excellent record, however, over half the citizens of the Commonwealth are deprived of the benefits of the latest developments of medical science and preventive medicine.[4] Until all the communities in the Commonwealth are covered with full-time medical health officers with special training in public-health work, until such men are given adequate compensation and until there is real co-ordination in all the public-health work of the Commonwealth at both state and local levels, preventive medical service of high quality will not be available to all the people of Massachusetts.*

Diagnostic and curative medical care go hand in hand. Far too much has been said in recent years about the cost and distribution of medical care, and much too little about the quality of services given. Both are important. Both must be developed. But unless the quality of service given

*Every member of the Society is urged to read the excellent survey of the program of the Department of Health referred to above.

is constantly improved, its distribution and the methods of paying for it are of little significance. You and I, who in the past have thought largely in terms of doing our daily work to the best of our ability, must now give thought not only to our patients but also to the organization and the development of our hospital and professional facilities to provide medical services of higher and higher quality, as well as to the development of organizations that make these services available to all the people of our communities. Fewer patients should come to our larger cities for care that can and should be given in their own community.

What, then, are the most important factors in a medical-care program whose object is to offer to a given community the best possible medical service, and what are our responsibilities as physicians in the development and utilization of these various factors?

A modern hospital of adequate size with an active, effective and co-operative governing board and an able, well organized professional staff are essential for a medical-care program of high quality.

Completely to fulfill its place in the community, the hospital must be the center of health activities. It is not enough that this hospital is of modern construction, well equipped and soundly financed. It must, in addition, be of sufficient size, preferably two hundred beds or more, although in many communities excellent, if more limited, medical and surgical services are being offered in smaller units. With few exceptions, however, hospitals with less than two hundred beds are dependent on larger institutions or outside personnel for many of the services essential to diagnosis and treatment of even the more frequent conditions. Also, the smaller the hospital, the more limited the staff and its clinical experience.

It has been suggested that a hospital of approximately two hundred beds can be efficiently maintained and offers sufficient clinical and laboratory material to assure well trained full-time radiologic, pathological and laboratory personnel. Moreover, the number of patients cared for is adequate to attract young men of ability and with proper training to assure a professional staff of high quality. I see little justification for the erection of general hospitals of fewer than two hundred beds except in rural areas, of which in this Commonwealth there are relatively few. How much better to follow the lead of the people of Newton and Wellesley and have adjacent communities join in the erection and maintenance of a plant of adequate size to be completely self-supporting and self-sustaining!

The trustees or governing bodies of our hospitals have a broader responsibility than the building and maintaining of the physical plant. One may well ask whether or not such a board is justified in urging a community to raise a large sum of money to erect and equip a modern hospital unless it is prepared to support, to encourage or, if necessary, to insist on the development of a staff organization that will assure a quality of care in keeping with the institution to be built and supported. There is too often lack of co-operation between the trustees and the professional staff. Only by continued exposure of each to the problems of the other can there be proper understanding. Without this, no lay person, no matter what his interests, can appreciate the many practical problems of the physician in the care of his patients, and only by a better understanding and closer co-operation between trustees and staff will it be possible for modern hospitals to function with their greatest efficiency.

Given proper facilities in which to work and a responsible, co-operative governing board, the quality of medical care is dependent on — in fact, is — the complete responsibility of the medical staff. We share with no one the training and experience necessary to develop for the people of our communities the high type of medical care to which they are entitled. Our American way of free enterprise has placed high award on individual initiative. Medicine, by its very nature, has encouraged in every way the development of the individual instincts in all of us. No one can ever criticize the great mass of American physicians for any lack of personal application to their professional work. But the many advances in medical knowledge and the increasing complexity of medical care require more than individual application if patients are to be assured of the best possible care. Medical care of high quality is the end product of combined and well co-ordinated efforts. It has as its objective the welfare of the community as a whole, as well as of the individuals within the community. What is for their benefit will prove to be to our interests. It is no longer possible for anyone — no matter how capable, well trained or conscientious — to give complete medical care to any segment of his community, nor is it necessary that he try in so enlightened a state as ours. The co-ordination of individual efforts through group organization or within the well organized staffs of our community hospitals is, then, the guide to our professional development.

In the great proving ground of America, group medical care of every kind has been highly developed and is being successfully carried out. It remains for us in our various communities to select and develop the particular type that best suits our needs. Whatever the pattern, whether it be as a closely organized specialty group as exemplified in this community by the Lahey Clinic, or whether it be the more frequent, loosely knit organization of the entire professional staff around its hospital, as probably most highly developed in the Commonwealth at the Baker Memorial Hospital, there are certain requirements that are essential. It must offer the development of major and, when possible,

minor specialties, with the head of each department certificated by his respective board; recognition of and encouragement to general practitioners (except in certain specialty and teaching hospitals); assurance of a continuing high quality of care through the institution and development of a teaching program; and facilities for and frequent use of unrestricted consultations.

The development of an effective staff organization (and for the moment I will restrict my comments to the surgical staff) that will attract well trained young men to our communities, assure them of an opportunity to develop and co-operate in the medical-care program and utilize the established personnel but at the same time develop a spirit of pride in and loyalty to the hospital and through it to the people of the community, rather than one of ownership in and jealousy of the hospital privileges that they enjoy, is a truly challenging responsibility. The people of this Commonwealth owe much to the hundreds of excellent surgeons who have learned surgery by long and continued application over the hard road of experience. Without them, surgery could not possibly have developed to its present high standard, and thousands of people in this Commonwealth would have been denied the relief that has been theirs through the untiring work of these men. But the advances in surgery over the twenty-eight years that I have been a member of this Society beggar our imagination. No body cavity, no viscus, is exempt from safe surgical approach. Resections of the stomach, colon or rectum are now carried out by our senior resident staff with a competence and safety that even ten years ago we should have thought neither practical nor possible. These advances have not just appeared. They are the result of continuous study and application of men in our teaching hospitals and their laboratories in co-operation with the laboratories of our medical schools. There have evolved new principles and a more thorough understanding of the old. Surgery has become too complicated, too all-inclusive for a young man to learn as a part of his daily medical practice or solely by association with an older man. The surgeon of tomorrow will be trained in the larger teaching hospitals of today and in the institutions that are developed tomorrow. Only by continued study and limitation of all his thoughts and efforts to the work of his choice can the surgeon of the coming generation expect and receive recognition by the governing boards of the hospitals in our larger communities. This generation of surgeons must be carefully trained in our hospitals under experienced supervision. Only in recent years have any of our hospitals, even the large teaching institutions in Boston, given sufficient training to qualify their graduates to do surgery in their own right. This is now being well done in many of our larger teaching hospitals throughout the country, but more opportunities are needed for young men anxious to give time and effort for a sound surgical training. The development of proper staff organization in the larger general hospitals of this Commonwealth not only will offer more opportunities for a new generation of surgeons but also will assure the patients in those hospitals of the high quality of professional care that goes with a resident program.

Organization of the hospital staff into the several specialties, each headed by a man certificated by the specialty board, interested in and willing to give enough of his time and effort to the development of his department, restriction of staff members to those limiting their work to their own specialty and the establishment of a merit system whereby appointments to and promotion of the staff are made on a basis of ability and application rather than seniority are the first steps in assuring professional care of the highest possible quality and to the later introduction of a resident program. I should add that, at least for the present, I consider it neither necessary nor desirable for a hospital to require that all its staff members be either certificated by their specialty boards or that those on the surgical staff be fellows of the American College of Surgeons. Insistence on these credentials will not in itself assure good care and is certain to prove a hardship to many able men who by years of application are capable of and are doing excellent work in their communities. Ability, application and a progressive and active interest in the continued development of the medical-care program rather than diplomas on the wall should be the basis for appointment to the staff of our community hospitals. I do believe, however, that all heads of departments and men holding senior staff positions should be certificated by their boards and that the surgeons in more responsible positions should be fellows of the American College of Surgeons.

Any staff organization that does not recognize and include the general practitioners of the community that the hospital serves is not giving full service to that community. There are those who have said that the days of the general practitioner are gone, but the general practitioner has been, is now and will continue to be the real backbone of our medical-care program. The American Medical Association has recognized this in the establishment of a Section of General Practice, and it is probably only a matter of a short time before there will be a specialty board to certificate men in general practice as well as men in the various specialties. They are an intimate part of medical care in any community and must therefore be an active part of the staff organization of all except the highly specialized or the large teaching hospitals.

Closely associated with the staff organization is the development of a teaching program without which no hospital staff can continue to fulfill its complete obligations to the community. Teaching at

some level is possible in every well organized institution. Teaching will be most effectively done and at its best if there are active young minds attached to the hospital as part of a training program. Even without interns or residents, however, hospital clinics, clinicopathological exercises and other scientific programs can and must go on continuously to stimulate the thinking and reading of the staff members and to assure to all patients of the community the benefits of the newer trends in medicine.

What about research? Let us never forget that all medical education and all investigative work have as their ultimate objective the improvement of the medical care of people who need it. Unless new discoveries can find clinical application, they are of little or no importance. One of the really great problems in American medicine lies in the practical application of what we learn to the people of the communities we serve. The possibilities for real constructive advances in the development of medical services in the hospitals of this Commonwealth are almost limitless. That many of even the common medical and surgical cases still come to our larger cities is a natural result of the concentration of the more highly trained internists and surgeons in those areas. As more young men are well trained in the various specialties, however, the trend in medical care for all but the more complicated conditions must be from our larger metropolitan teaching centers back to the communities in which the patients live. The opportunities for men with imagination to develop sound, workable programs in our community hospitals that will make this possible offers a challenge equal to that of the teaching hospital and its laboratories.

Probably one of the most important contributions of good staff organization and co-operation comes from the free exchange of knowledge through frequent use of consultations. These consultations, to be truly effective, must be unrestricted and must make use of any member of the hospital staff, or if necessary of the staff of a neighboring hospital, who can give the greatest help toward the solution of a given patient's problem. In no small degree, the excellence of care given in any one of our hospitals is reflected in the degree to which the consultation service utilizes the knowledge and experience of the entire professional and laboratory staff.

Available to Everyone — Regardless of Race, Color, Creed, Financial Status or Place of Residence — Every Known Essential Preventive, Diagnostic and Curative Medical Service of High Quality.

To make medical care available to all the people of the Commonwealth, 84 per cent of whose net weekly income is below $60, when the cost of a ward or semiprivate bed in a Boston hospital (exclusive of the cost of special nurses and professional care) varies from $80 to $90 a week, is a challenging undertaking. In addition to a mechanism of providing for those who cannot pay for themselves and of obtaining more complete prepayment coverage of the remainder of this group, careful re-evaluation of our present pattern of hospital care should be undertaken so that when economic conditions permit, hospital services may be altered to allow complete coverage to the patient in a ward or semiaccommodation at the lowest possible cost to the hospital and patient, with this cost shared by all patients, whether actual or potential recipients of total service, and paid for through membership in a voluntary prepayment plan. Accomplishment of this goal can be possible only if there is thoughtful, aggressive, co-operative effort of the public, the medical profession, the hospital and nursing authorities, our voluntary medical and hospital services, our charitable agencies and the local and state government units.

To assure continuing improvement of the quality of medical care requires additional effort by and co-operation between hospital governing boards and the professional staff. A well run hospital of adequate size with an effective staff organization, a teaching program and finally the development of resident training will offer to its community a quality of service of which it can be justly proud.

You and I have the good fortune to live at a time and in a state when what should be can be — but only if we as individuals as well as a society offer the active far-sighted leadership and the co-operation with other agencies that are so essential to success.

The attainment of such medical care must necessarily be an evolutionary process which will require the co-operation of all concerned over a period of years.[4]

Addendum. I am indebted to those innumerable and stimulating committee meetings, conferences, personal discussions and communications from which I have learned and to which I owe so much.

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THROMBOPHLEBITIS—THE PROBLEM OF TREATMENT*

HOLLIS L. ALBRIGHT, M.D.†

BOSTON

MUCH has been done by members of the New England Surgical Society and their associates leading to greater understanding of thromboembolism. A recent thorough and searching review by Homans[1] is classic in its contribution both to the student and to the clinician responsible to his patient. In the light of this and with exceeding deference, some of the problems arising in the approach to the patient with acute thrombosis of the deep veins of the extremities are discussed. The widespread consideration of this problem from many points of view attests to the uncertainty concerning any single most effective method of treatment.

There is general agreement regarding vigorous prophylaxis to maintain muscular tone and circulatory efficiency. Ochsner[2] stops his patients from smoking ten days before operation, applies compression bandages from ankle to groin and routinely employs dry heat to the abdomen and not to the extremities, to lessen peripheral vasospasm. Gentle operative technic without overmanipulation of the viscera and avoidance of surgery during the menstrual period find general acceptance. Postoperative elevation of the foot of the bed for forty-eight hours has been favored to aid in emptying the veins of the extremities. Most surgeons encourage their patients to wiggle their toes a thousand times three times daily, to leg movements every three to five minutes and to bicycle exercises. Many practice early rising, which has been termed "early ambulation."

Early ambulation may prove to be helpful. It should not be permitted to prove harmful. Allowing especially the elderly or debilitated patient to sit with the legs hanging in a flaccid dependent position, crossed or uncrossed, is not early ambulation. It is my opinion that the postoperative patient should either walk upright or remain lying in bed, being allowed up in a chair only when he is able to walk to it. Exercise of the leg muscles should be practiced while the patient is sitting. An increase in the frequency of headache following spinal anesthesia has caused me usually to defer early rising until at least forty-eight hours after operation.

In the care of the patient with signs of obstructive deep phlebitis of the extremities, the risk of embolism, however slight, is recognized early. A feeling of increased resistance of the tissues has proved a helpful sign, along with slight swelling and Homans's dorsiflexion sign. Bauer,[3] from a large experience, advises early phlebography as routine in all cases of suspected thrombosis, on the vaguest chest or local signs. Suggestive chest signs of infarction, of course, increase the urgency of decision regarding the method of treatment.

Little reliance should be placed on any attempt to differentiate a nonadherent and an adherent clot. Both have been observed in the same vein on several occasions. In 5 patients with femoroiliac thrombosis an adherent femoral thrombus, with proximal nonadherent grape-jelly clot in the iliac veins, was observed.

Most authorities agree that early and frequent use of sympathetic blocks with novocain throughout the period of pain, tenderness, fever and swelling may prove helpful. Injection of 10 cc. of 1 per cent novocain into the region of the first, second, third and fourth lumbar sympathetic ganglions unilaterally or bilaterally has been employed, 100 cc. of 1 per cent novocain being recognized as the accepted toxic dose. Tulane's young graduates practiced this with frequency in Army wards, as a result of Ochsner's insistence that every student be familiar with the indications for and easy execution of this as a ward procedure.

Decision should be made early — within the first twenty-four hours — concerning the major course of treatment, whether anticoagulants or proximal-vein ligation, or both, are employed. Attention should then be directed to the possibly helpful use of adjuvant measures, not only to safeguard against embolism but also to protect the collateral channels against spread of the thrombophlebitic process. A cradle with a light over the abdomen, abstention from smoking and sympathetic novocain blocks on the obstructed side, in addition to the equivocal effect of papaverine, may lessen vasospasm. Early exercise and post-ligation use of heparin or dicoumarol may further aid in quicker subsidence of the inflammatory process and may lessen the late effects on circulatory efficiency. Smithwick[4] has suggested that in his experience sympathetic novocain block in the heparinized patient seems to produce increased effect.

If anticoagulant therapy is decided on, in the light of many published favorable experiences with both heparin and dicoumarol,[3, 5] certain facts should be kept in mind. Sustained vigilance of the unstable clotting times is essential for several days. With heparin the venous clotting time, checked twice daily to maintain an optimum time of between thirty and forty-five minutes, was observed to rise quickly to two and a half hours, fortunately with no ill effects. Both heparin and dicoumarol should be

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†Assistant professor of surgery, Boston University School of Medicine.

used with extreme care in wounds involving the cranial, pleural and abdominal cavities and in fractures encased in plaster. Hematuria and hemorrhage into joints have been reported as untoward effects.[3] Heparin clears from the blood quickly, within two or three hours. Dicoumarol produces no effect on the clotting time until the prothrombin level has been reduced to 30 per cent of normal.[6] It requires two or three days to become effective, and loses its effect on the prothrombin level slowly. Properly administered, both heparin and dicoumarol seem undoubtedly effective despite the still obscure mechanism of their control of the formed clot.

When ligation of the involved or suspected veins has been decided on, every effort should be made toward early ligation. This may avoid the more drastic ligations at higher levels and should reduce the real frequency and severity of postoperative swelling, which still limits somewhat the acceptance of this procedure.

In an experience with 8000 patients in a fixed Army general hospital in England during the eleven months from D Day (June 6, 1944) to VE Day (May 11, 1945), 9 patients were subjected to proximal ligations at levels higher than the superficial femoral vein. Interest was stimulated toward ligation as the safest method of control, not only on the basis of civilian experience but also on autopsy observation on 2 soldiers in whom embolus had plugged the pulmonary arteries, with a truncated adherent thrombus in the right internal iliac vein in one patient and in the left common femoral vein in the other.

All nine patients had demonstrable obstructive thrombophlebitis. Five operations, which were done relatively late in the disease, — ten days to several weeks after battle injury, — required ligation of the common iliac vein on the involved side, with supplementary ligation of the superficial femoral vein on the apparently uninvolved side. The remaining 4 cases developed during the hospital stay. Chest symptoms and signs or x-ray findings suggestive of pulmonary infarction were present in 6 cases. Bilateral ligation was done in 5 cases, and unilateral in 4. Additional measures in conjunction with ligation were used too meagerly, in retrospect.

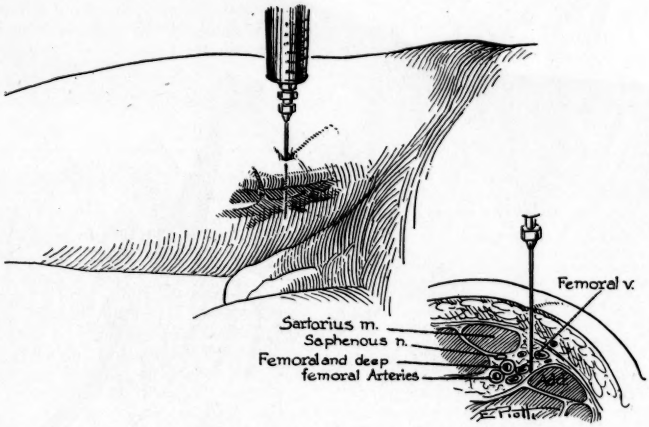

FIGURE 1. *The Vertical Injection of Novocain about the Great Vessels.*

Heparin was used intravenously in only 3 patients, and lumbar sympathetic blocks with novocain in 2.

Although caution should be emphasized in the impressions gained from a few cases in such young patients, ranging from nineteen to thirty-six years of age, it may be stated that no further pulmonary disturbances developed, no untoward results were noted (except for nonincapacitating edema in 2 patients), and all patients, both in and out of leg casts, were allowed out of bed much earlier than they would have been without ligation. Follow-up letters seventeen months after these studies have revealed no additional sequelae.

The anesthesia employed was local in 4 patients at the level of the common femoral vein, and general in the 5 cases of iliac ligation (spinal anesthesia in 3, and ether in 2).

Certain technical features of ligation seem worthy of mention. Signs of pulmonary infarction or of phlebitis of the pelvic veins impel one to ligate at the level of the common femoral and iliac vein or of the vena cava, respectively, with due regard for control of the veins of both extremities. These

high proximal ligations, however, should be less frequently necessary if early ligation of the superficial femoral vein, preferably bilateral, in combination with other helpful measures, is performed. With this in mind, attention will be directed toward

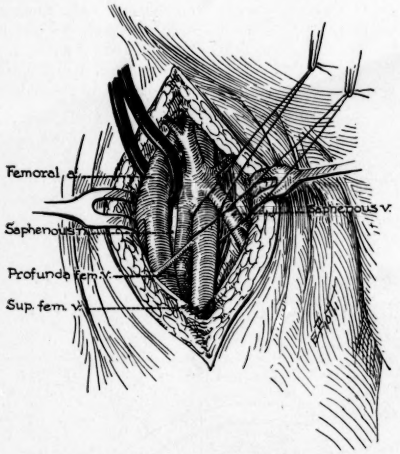

FIGURE 2. *Isolation of the Superficial Femoral Vein. Exposure of the deep vessels is facilitated by preliminary retraction of the femoral artery. Care is taken to avoid injury to the great saphenous nerve. The profunda femoris vein is visualized.*

the technical aspects of ligation of the superficial femoral veins.

Excellent results have been obtained with the use of local anesthesia for ligations below the inguinal ligament by the simple technic illustrated in Figure 1. After skin and subcutaneous infiltration with approximately 20 cc. of 1 per cent novocain, 10 cc. is injected through a needle inserted vertically to the level of the great vessels at a point overlying the fossa ovalis — that is, 2.5 cm. lateral to and 1.5 cm. below the anterosuperior spine. Careful aspiration guards against injection into a vessel. Usually, no further injection is required. This procedure has likewise proved eminently satisfactory for ligation of the saphenous vein and its tributaries.

An adequate, 8-cm. longitudinal incision is made just medial to the pulsating femoral artery as a guide (Fig. 2). Transverse incision may be extremely hazardous because of its restricted exposure at the level of the deep vessels and may interfere with the lymphatic drainage of the extremity. Generous exposure at the deep level is essential. The incision should not be allowed to become narrow and conical in depth, giving dangerously restricted exposure, especially when the perivascular inflammatory reaction is marked.

With retraction of the sartorious muscle laterally, care should be exercised against injury to the large saphenous nerve coursing in the fascia overlying Hunter's canal. This is the large terminal branch of the femoral nerve. Injury has not infrequently occurred, in my experience, producing disturbing hypesthesia along the inner lower thigh and leg areas.

There is nothing superficial about the superficial femoral vein. It lies not only medial to but also far below the femoral artery in Hunter's canal. It comes into view only when the femoral artery has been first exposed, carefully freed and retracted with soft rubber Penrose tubing. Because of the deep position of the vein the term "distal femoral" rather than

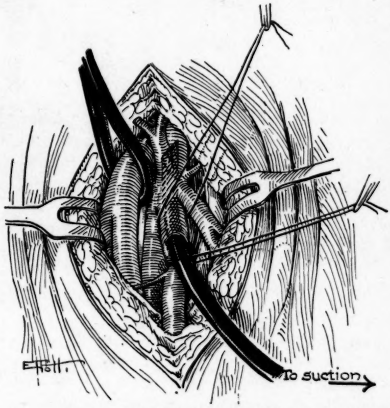

FIGURE 3. *Removal of the Thrombus. Aspiration is continual until brisk retrograde flow is obtained. The distal vein segment is later aspirated.*

"superficial femoral" vein has seemed more accurately descriptive.

Before a clamp is passed beneath the superficial femoral vein, the deep tributaries arising from the posterior aspect of the vein — namely, the profunda femoris and the large muscular branches — should be visualized. Failure to do this in one patient led to alarming deep hemorrhage, unrecognized damage to the femoral artery and midthigh amputation for gangrene seven days later. In an additional patient with restricted operative exposure, the damaged portion of the femoral artery required resection, followed by anastomosis and immediate heparinization. This resulted fortunately in a successful outcome.

Isolation of the femoral vein just distal to the profunda femoris vein (Fig. 3) prepares the vein for partial transection and gentle catheter or glass-tube aspiration of all proximal clot until brisk retrograde flow is obtained. It is my practice to

explore the profunda femoris vein with a hypodermic needle to aid in deciding whether to ligate proximal or distal to the profunda femoris vein. Additionally, ligation at the lower level is regarded as inadequate if there is proximal, adherent, fragmented thrombus that is removed with difficulty.

After brisk retrograde flow has been obtained and the proximal vein segment secured, aspiration of the distal vein segment is carried out before complete section and transfixion of the vein. It has been my impression that subsidence of the local thrombophlebitic reaction has thereby been encouraged.

FIGURE 4. *An Organized Floating Thrombus.*

Postoperatively, elastic bandages are applied from ankle to groin, and the patient is allowed out of bed as soon as his physical condition permits.

Figure 4 shows a nonadherent, organized thrombus 8 cm. in length, removed from the right common femoral vein of a thirty-six-year-old infantry sergeant. The patient had sustained multiple battle wounds thirty-two days previously, including a compound fracture of the right tibia. Unexplained pain in the left side of the chest for thirty hours had been noted. X-ray films of the chest were unrevealing. There was slight tenderness over the femoral vein in the fractured leg. When the vein was opened there was brisk, apparently normal flow of blood as the midportion of the torpedo-shaped thrombus presented itself for easy removal. Recovery was uneventful.

Finally, in addition to vigorous prophylactic measures, it may prove wise in certain cases to ligate the superficial femoral veins bilaterally prior to a planned operation or long illness. Rigidly controlled indications for this should be well understood.

* * *

An ever-alert approach to the confined patient with emphasis on prophylaxis, early recognition and treatment with either anticoagulants or proximal ligation, or both, should offer the patient a large degree of protection against thromboembolism. It is toward the control of pulmonary embolism without warning, however, that preliminary ligation is largely directed.

In addition to early ligation distal to the profunda femoris vein, combined use of sympathetic blocks, heparin or dicoumarol and early rising should offer greater protection than ligation alone, not only against thromboembolism but also against damage to the collateral vessels. Both vasospasm and obliterative endophlebitis spreading to the indispensable collateral vessels may thus be lessened. Judicious employment of a combination of helpful procedures, rather than any single procedure, may offer greater protection to the patient. Disturbing sequelae should be lessened, and the more drastic higher ligations less often necessary.

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DISCUSSION

DR. JOHN HOMANS (Boston): Dr. Albright has covered a good deal of ground with a great deal of intelligence and common sense. It is rather difficult to find fault with anything he has said about thrombophlebitis. I am perfectly certain that he has a comprehensive understanding of it.

It seems to me that if I were to criticize, in a friendly way, his presentation, I should say that he had drawn a good many conclusions from his military experience, if I understand him correctly, in the surgery of these youngish patients. I have previously heard discussion of the matter of thrombosis in such patients, and apparently when the man of military age suffers a thrombosis he tends to become extremely thrombophilic; the ordinary methods of handling this thrombosing process seem to work in different ways from those of older persons. I have heard of a good many vena-cava ligations and so forth.

Actually, I find myself more interested in these days in the problem of thrombosis in cardiac and medical patients who really offer a continuing problem, because they are confined to bed with serious disease, and the matter of preventing them from having thrombosis and embolism is quite a different one from what it would be in younger persons — for instance, those who have suffered accidents or have been operated on.

I suppose one must decide, as I am sure the Massachusetts General Hospital group have decided, that there are certain cases that can be handled in no other way than by prophylactic vein division — for example, patients who must be operated on for serious abdominal diseases. Such patients, and probably some of the cardiac patients as well, can evidently be subjected to a superficial femoral division with a great deal of satisfaction.

The Swedes have an interesting idea of trying to prevent thrombosis from rising above the knee — above the popliteal vein — on the ground that once the thrombosis reaches the femoral vein, that vein will be crippled and the future of the leg will present quite a serious problem. They have therefore decided to try to make an early diagnosis under the usual circumstances in which thrombosis is likely to arise. Then they attempt to prevent the progress of the process by the use of anticoagulants. In a way, that is a more reasonable approach to the subject than the use of the division of the vein, and I must say that I am sympathetic with it.

I should like to go a little farther and say that in the occasional patient who suffers a thrombosis below the knee in everyday life, the future is likely to be a great deal brighter if the process can be subdued by anticoagulants than if the femoral vein is divided. The question is whether there is an equal amount of safety in the two procedures. I am still utterly uncertain about that point, but having divided a good many veins in persons with fairly extensive thrombosis that has probably not already crippled the superficial femoral vein, I should rather not divide a femoral vein if I can stop the process from rising to the level of the groin by the use of anticoagulants. That is a point of view that Dr. Albright

did not present. I should like to hear his opinion about it.

His system of operating on patients who already have a fairly extensive process, I think, is ideal. I do not like divisions of the common femoral vein above the profunda. If it is safe to remove the thrombus by opening of the femoral vein below the profunda, and especially if afterward one can make use of anticoagulants, that seems a better way to handle the process.

I should like to have Dr. Albright's view on the use of anticoagulants after division of the superficial femoral vein. I know that there are a great many other aspects of this subject. I have merely spoken of some that occurred to me as being among those that perhaps Dr. Albright did not go into with great detail.

DR. ARTHUR W. ALLEN (Boston): I am amazed at how closely Dr. Albright's paper follows my own views on the treatment of thrombophlebitis, and I should like to congratulate him on having presented it as well and as quickly as he did. In other words, I agree with him that we have three useful measures of treatment at our disposal, and quite often all three should be used.

I want to speak for a moment about the prophylaxis of thrombosis. I am quite sure that the future primarily holds for us the duty of preventing the patient from developing a thrombosis with a possible embolism. Patients in the young and middle age groups who do not have diseases that contraindicate the use of anticoagulants can safely be protected from thrombosis by a controlled, careful use of heparin and dicoumarol, but there is a limit to the number and the type of cases to which this can be applied.

The high incidence of thrombosis and embolism in older patients, particularly those with leg injuries, as Bauer, Veal and Homans have emphasized, is to be considered in a slightly different category.

In the treatment of thrombosis to prevent further embolism, we soon learned that we should interrupt both femoral veins. We were much interested to find that if we interrupted a normal femoral vein, symptoms such as swelling in the legs rarely occurred. This came as quite a surprise in spite of the fact that the femoral vein had formerly been interrupted in an effort to benefit the circulation in cases of thromboangiitis obliterans. A short period of edema that did not always occur was expected, but I think that the significance of this did not register until we had experience with a great many hundred cases, in which it was found that if the vein was interrupted before thrombosis developed, the sequelae were negligible.

In 50 consecutive cases of fractures about the hip we have recently interrupted prophylactically the superficial femoral vein bilaterally. In none of those patients has an embolism occurred, and in none has any evidence of thrombosis appeared.

In the preceding 50 cases, which were exactly identical and did not have this prophylactic interruption, there were 5 proved fatal cases of pulmonary embolism, — a rate of 10 per cent, — and there were 2 additional patients who died similarly, probably from embolism, although no autopsy was performed.

We have now more than 450 patients in the older age group who would formerly have been treated in bed for one cause or another but who have had what we consider prophylactic femoral-vein interruption. In other words, interruption has been done shortly after the period of bed rest has been necessary and theoretically before any thrombosis has occurred. There has been only 1 case in which a fatal embolism later occurred. In that group we should have expected a great many deaths from embolism. There has only been 1 case of a mild thrombophlebitis below the knee, as well as a few cases of minor transient edema, but most of the patients showed no signs or symptoms from this adequate protection against thrombosis and embolism.

DR. E. EVERETT O'NEIL (Boston): Perhaps my opinion and my position are somewhat unfair, but some years ago when we first started using heparin and dicoumarol, we had an extremely unfavorable experience with the anticoagulants. For that reason we soon forsook our position in using them as a form of therapy and have subsequently adhered rigidly to the division of large veins as a measure of handling deep venous thrombosis.

Like Dr. Homans we have in most cases practiced division of the superficial femoral vein, and for similar reasons. Our experience with division of the deep femoral veins has not been good, because we have found that there have been many cases in which residual swelling has persisted for long periods, beyond what we have seen in division of the superficial femoral veins.

That is perhaps an academic matter, however. Nevertheless, the operation of dividing the superficial vein is slightly easier than dividing the common femoral, and perhaps lends itself more easily to practice by residents and house officers, who usually do the operation in the large hospitals.

So far as the anticoagulants are concerned, surgeons are interested in using some procedure that may guarantee before operation that venous thrombosis will not occur. Anticoagulants certainly cannot be used before operation, and there therefore is no guarantee that the patient will not die of embolism one or two days or even hours following the operation, because what has not been stressed by the proponents of anticoagulants is that thrombosis may be present long before operation has been started and, as I have suggested, lethal embolism may occur shortly thereafter. Therefore, one must take the quickest measure of circumventing this catastrophe, and that, in my opinion, is division of the proper veins.

Our opinion of prophylactic venous divisions is similar to that of Dr. Allen. More and more prophylactic venous divisions will be done in properly selected groups, which we know by experience lend themselves to venous thrombosis.

I think — and this fact should be emphasized — that when a normal femoral vein has been divided, swelling seldom if ever occurs, and that brings up the point that early diagnosis in deep femoral thrombosis is the *sine qua non* of success in the handling of these cases.

If the diagnosis is made early and the veins are tied early, not only will more lives be saved but also many of these complications, such as swelling, will be averted.

DR. DONALD MUNRO (Boston): As a result of my experience and from listening to the paper and the discussions, I am confused regarding certain aspects of this problem. I gather from what has been said that it is considered important that patients be mobilized early — particularly the legs — to prevent the development of thrombosis and embolism and that in pursuance of that ideal, prophylactic ligation of the femoral veins has met with widespread approval.

I do not understand why patients that I see who have been paralyzed as a result of spinal-cord injuries, whose legs are certainly as immobile as possible and who lie in bed for months or often for years do not get femoral thrombosis or embolism even though the veins have not been ligated prophylactically or therapeutically.

I have rather detailed knowledge of about 250 such cases. Although I cannot give the exact figures, I do not believe that we have had any patient who died as a result of pulmonary embolism among this group, and I am sure that the incidence of femoral thrombosis is so low as to be negligible.

I have also less intimate knowledge of between 500 and 600 similar patients that I have seen in various Army hospitals. Two hundred of them I am quite familiar with. Certainly, femoral thrombosis and pulmonary embolism in those cases were so rare that in no hospital that I have visited has the question been raised whether there was any need to do anything to prevent such complications.

DR. ALBRIGHT (closing): Regarding the use of anticoagulants to prevent progression of the clot from the leg to the femoral vein, it is difficult to pass judgment. Heparin in Pitkin menstruum may be employed, and I prefer that to dicoumarol. From recent experience, Dr. E. V. Allen has stated that small doses of dicoumarol that reduce the prothrombin time slightly will not affect the coagulation time or the clot. There must be a reduction of the prothrombin time to 30 per cent or less. If it is between 30 and 100 per cent, no effect has been produced by the dicoumarol.

I have no objection, if one decides to use anticoagulants, to using them well and effectively. Pitkin solution of heparin can be given easily, in small subcutaneous doses, the effect lasting for two days, and controlled by venous clotting times. Dicoumarol requires two or three days to become effective, and if one wishes to stop it, its effect lasts an additional few days.

The anticoagulant may be started usually two days after ligation. Intravenous heparin clears from the blood within a few hours, and may be stopped if a bleeding tendency occurs.

In vascular surgery, especially in arterial anastomosis, heparin has frequently been used without untoward effect. In my experience bleeding occurred more frequently in large avulsed wounds, controlled by discontinuance of the heparin and pressure dressing.

I am quite conscious of the fact that these Army patients were young. My civilian patients have been largely in the group over forty years of age.

In patients with fractures, as Dr. Allen pointed out, I believe that prophylactic ligation should be given proper consideration. Overseas, the wards were filled with patients in casts. It was extremely difficult to evaluate leg pain, fever and the question of venous tenderness by palpation under the edge of the cast at the groin or midthigh level. The decision whether the pain was caused by the regional swelling about the fracture, infection or thrombophlebitis proved a real problem. Consequently, several patients had chest signs before ligation was carried out.

Dr. O'Neil has emphasized the desirability and urgency of early ligation, with which most of us agree. Actually a certain number of patients are first seen in an advanced, late stage of thrombophlebitis requiring ligation at higher levels. This makes it difficult to lessen the incidence of postoperative disturbances, which tend to limit the acceptance of this procedure.

Dr. Munro wishes to know why his paralyzed patients do not get thrombosis or embolism. Because of the paralysis from the waist down, there is no factor of vasospasm or arteriolar spasm. Ochsner considers the element of vasospasm so important that he teaches his medical students to perform repeated lumbar sympathetic blocks with novocain, regardless of whether ligation is performed or heparin given. The absence of vasospasm in these young patients, who have excellent cardiovascular systems with efficient muscle and elastic vessel walls, probably constitutes the chief explanation of the infrequent thrombi.

THE EFFECT OF RESTRICTED INTAKE OF CAROTENE AND VITAMIN A ON PSORIASIS VULGARIS*

A Preliminary Report

RICHARD HOFFMANN, M.D.,† EVELYN J. LORENZEN, PH.D.,‡ AND ARLENE S. GARFINKEL, B.A.

BOSTON

KNOWLEDGE concerning the etiology and pathophysiology of psoriasis vulgaris is limited. Certain characteristics of the disease are generally recognized, however. One of the main physiologic functions of the epidermis is the production of keratin necessary for the protection against and for the repair of injuries to the cutaneous system. In the skin of a psoriatic person the mechanism of keratinization fails whenever increased demands on the protective and reparative processes of the epidermis occur. Instead of completely keratinized cells, defectively cornified — that is, parakeratotic cells — are produced.[1–3] The extent and degree of the parakeratosis are related to the clinical activity of the psoriasis. In early stages the characteristic parakeratosis usually extends uniformly across the lesion, becoming even more uniform and greater in rapidly developing and progressing lesions. Quiescent and healing lesions show hyperkeratosis in place of or together with parakeratosis.[4–6] Psoriasis rarely occurs in Negroes.[7–10] This may be explained by the greater thickness of the stratum corneum of the skin in Negroes as compared with that of the skin in Whites,[9] and by its greater resistance to external irritants.[9–11] Both properties oppose the establishment of psoriasis. Careful sun treatment, local application of tar, sulfur, chrysarobin and so forth and internal administration of inorganic arsenic compounds are widely recognized as beneficial agents in the treatment of psoriasis. Various factors are operative in the action of these remedies. They have in common, however, a distinct keratoplastic effect, which may be of importance in the correction of the defective keratinization.

A low-fat diet has likewise received favorable recognition in the treatment of psoriasis. Grütz and Bürger,[12] the originators of this therapy, concluded that psoriasis was a "lipoidosis" and that a

TABLE 1. *Dietary Allowance of Foods Containing Vitamin A.*[20, 21]

Foods§	Amount	Vitamin A Content *international units*
Breads and cereals:		
Baking-powder biscuit, medium size	1	25
Wheat germ	1 tablespoon	40
Dairy products:		
Buttermilk	1 glass	50
Skimmed milk¶	1 glass	25
Cottage cheese	1 tablespoon	20
Fruits:		
Applesauce, canned	1 sauce dish	50
Blackberries, canned	½ cup	50
Cherries, white, canned	12	10
Cranberry sauce	3 tablespoons	10
Dates	4	50
Figs, dried	2	20
Grapefruit, medium size	½	20
Grapefruit juice	½ cup	10
Grapes, green	20	20
Honeydew melon	¼	10
Pear, medium size	1	30
Raisins	½ cup	30
Strawberries	10	50
Vegetables:		
Beet, medium size	1	50
Cabbage, white	½ cup	50
Cauliflower	½ cup	50
Celery hearts	3 stalks	15
Cucumber, peeled	8 slices	15
Eggplant	¼ cup	30
Lentils, cooked	½ cup	15
Onions, mature, medium size	2	50
Potato, white, medium size	1	40
Radishes	10	10
Sauerkraut	⅔ cup	15
Turnip, white	½ cup	15
Meats:		
Bologna	4 slices	10
Frankfurt, medium size	1	25
Fish:		
Cod	4 oz.	10
Haddock	4 oz.	10
Halibut	4 oz.	15
Trout	3 oz.	10
Whitefish	3 oz.	10
Desserts:		
Walnuts	5	20

§Patients were instructed to select foods from each group, the daily total being within the individual allowance of vitamin A.

¶Patients were instructed to consume 2 glasses of skimmed milk daily, or supplementary calcium (calcium diphosphate) was prescribed.

*From the Departments of Dermatology and Medical Research, Beth Israel Hospital.

This study was supported in part by a grant from the Leanermaise Company Fund to Harvard Medical School.

†Visiting dermatologist, Beth Israel Hospital.

‡Research fellow in medicine, Harvard Medical School.

lowering of the fat content of the cutaneous elements was the basis of the beneficial effect. There has been considerable disagreement, however, regarding both the theoretical basis for this treatment and the findings of increased lipids in the serum and in the skin of psoriatic patients.[4, 6, 13–17]

Since a defect in the reactive process of keratinization appears to be an essential factor in the pathophysiology of psoriasis and since keratoplasia is observed in vitamin A deficiency,[18–29] it occurred to us that the improvement of psoriasis subsequent to the Grütz–Bürger low-fat diet might be due to the simultaneous decrease in the supply of vitamin A. The purpose of this investigation is to observe the influence of a diet low in vitamin A on the clinical course of psoriasis.

Procedure

Only patients who had had extensive psoriasis vulgaris of long duration without experiencing spontaneous remissions were studied. A maximal daily intake of 150 to 300 international units of vitamin A was allowed (Table 1). Foods containing more than 50 international units of vitamin A per average serving were prohibited whereas foods free of vitamin A were allowed in unlimited amounts. A record of the daily intake of each patient was evaluated every two weeks by the dietitians of the Food Clinic. To ensure an adequate intake of other essential nutrients, supplements of vitamin B complex, ascorbic acid and iron were added to the diet in the majority of cases. Patients were specifically instructed to consume a sufficient amount of fats free of vitamin A to compensate for the omission of fats containing vitamin A. No local treatment except white vaseline was used.

Physical examinations were repeated at intervals of two to four weeks. Skin biopsies were examined microscopically in the majority of patients before the diet was begun and thereafter at intervals of three to six months.

Clinical supervision and the reports of the patients regarding adherence to the diet had to be relied on in the early stage of the investigation. At present, in conjunction with the clinical observations, the plasma carotene and vitamin A levels are determined periodically by the colorimetric method of Kimble.[32] These data afford an objective measure of the patient's co-operation in adhering to the diet, an insight into the extent of the correlation between the clinical and biochemical changes and some assurance that a harmful degree of vitamin A deficiency has not developed.

TABLE 2. *Effect of Diet Restricted in Carotene and Vitamin A.*

Case No.	Sex	Age	Duration of Psoriasis	Type of Lesions	Duration of Diet	Interval before Slight Improvement	Interval before Marked Improvement	Interval before Complete Clearing
		yr.	*yr.*		*mo.*	*wk.*	*wk.*	*wk.*
1	F	65	55	Generalized nummular and discoid erythrodermatic, spreading	7	—	8	16
2	F	36	Since childhood	Generalized nummular and discoid erythrodermatic, spreading	12	8	14	40
3	F	22	5	Generalized erythrodermatic	8	5	10	14
4	M	53	8	Generalized nummular discoid	9 5	10 —	18 16	— —
5	M	43	2	Discoid	11	—	8	20
					5	8	16	—
6	M	34	10	Nummular discoid	4 1	10 4	— —	16 —
7	M	49	12	Inveterate discoid	7	—	—	—
8	F	37	17	Generalized discoid and nummular	8	10	—	14
9	F	40	3	Generalized erythrodermatic and discoid	6	12	16	—
10	M	25	Since childhood	Generalized discoid	3¼	12	—	—
11	F	31	Since childhood	Guttate nummular discoid	5	—	14	20

Observations

In 9 of 11 cases the psoriatic lesions markedly improved or completely cleared within eight to forty weeks after the initiation of the diet restricted in both carotene and vitamin A (Table 2). The first definite signs of improvement appeared within four and twelve weeks. Since spontaneous amelioration is frequently experienced during the summer months,[34] improvement noted during the months of April to October was not considered significant.

Table 2 (*Continued*).

Case No.	Plasma Carotene Content		Plasma Vitamin A Content		Remarks
	Restricted diet	Normal diet	Restricted diet	Normal diet	
	microgm./100 cc.	*microgm./100 cc.*	*microgm./100 cc.*	*microgm./100 cc.*	
1	—	—	—	—	On daily vitamin A intake of 1500 international units, only few nummular lesions on elbows and forearms after 8 wk.; resumption of normal diet followed in 8 wk. by relapse; slight spreading during following year; no change in weight on diet.
2	—	111	—	38	After 16 wk. on daily vitamin A intake of 2000 international units, 1 nummular lesion on each hip, which became slightly larger in next few months; no generalized spreading during last 2 winters; weight varied from 110 to 113 pounds.
3	—	—	—	—	Weight gain from 105 to 118 pounds on restricted diet; resumption of normal diet followed in 8 wk. by relapse.
4	—	—	—	—	No change in weight on diet; no further improvement observed on daily vitamin A intake of 1500 international units for 3 mo.
	60	—	47		
	61		48		
5	—	—	—	—	Slight relapse after 11 mo. on restricted diet, followed by continued spreading; diet discontinued on complaint of fatigue, anorexia and weight loss of 6 pounds.
	64	—	34	—	Daily intake of approximately 800 international units of vitamin A in 2nd phase
	80		38		
	90		38		
6	—	—	—	—	Relapse 4 wk. after resumption of normal diet, followed by continued spreading; another relapse, with continued spreading, 8 wk. after resumption of normal diet.
	—	—	—	—	
7	—	—	—	—	No improvement; patient unable to maintain normal caloric intake on restricted diet; weight loss of 9 pounds.
8	48	75	35	35	Weight gain of 7 pounds on restricted diet; relapse 6 wk. after supplementation of intake with carotene equivalent to 20,000 international units of vitamin A daily.
	55	51	56	40	
	37		42		
9	18	41	28	23	Relapse 6 wk. after change to diet restricted only in vitamin A intake*; weight loss from 112-105.5 pounds.
	38		30		
10	<7	22	44	44	Relapse 3 wk. after resumption of normal diet because patient was unable to maintain a normal caloric intake and lost 5 pounds in weight
	14	63	43	55	
		101		51	
11	21	—	48	—	No weight change on diet

*Carotene intake unlimited; 3 tablespoons of mineral oil daily added to diet, since mineral oil has been shown to interfere partially with absorption of carotene from the gastrointestinal tract.[33]

Of the 6 female patients 5 showed complete clearing, and 1 marked improvement, whereas of the 5 male patients 2 showed complete clearing, 1 marked improvement and 1 slight improvement and 1 remained unimproved. One patient (Case 5), whose lesions had completely subsided within twenty weeks, experienced a slight relapse after having been on the restricted diet for eleven months. He was unable to maintain a sufficient caloric intake, had lost 6 pounds and complained of tiredness and anorexia. These symptoms disappeared soon after the resumption of a normal unlimited diet; the psoriasis, however, continued to spread during the following ten months. Improvement was observed within eight weeks after the initiation of a dietary regime restricted to 800 international units of vitamin A. No untoward effects were observed in any other patient.

In 6 patients who had shown marked improvement or complete clearing of the lesions, relapses occurred within three to eight weeks consequent to the resumption of a normal unlimited diet, and in 1 patient six weeks after supplementation of the restricted diet with carotene. Within two weeks after the carotene supplementation had been discontinued this patient again showed marked improvement.

Plasma carotene and vitamin A determinations were not done in these cases prior to the beginning of the diets low in vitamin A. Determinations in 6 patients during the dietary regime, however, ranged from an undeterminable amount to 80 microgm. of carotene and from 23 to 48 microgm. of vitamin A per 100 cc. of plasma. For comparison, the plasma values of 26 normal subjects on an unrestricted dietary regime showed an average of 149 microgm. of carotene (range, 65 to 237 microgm.) and an average of 43 microgm. of vitamin A (range, 26 to 64 microgm.) per 100 cc.

Corresponding values in 25 other psoriatic patients prior to dietary treatment were 139 microgm. of carotene (range, 65 to 310 microgm.) and 51 microgm. of vitamin A (range, 28 to 73 microgm.) per 100 cc. of plasma. To date, plasma carotene and vitamin A levels have been determined at intervals of two weeks in 8 of these patients who have been on the restricted diet for a period up to ten weeks. The carotene levels showed a reduction of from 35 to 68 per cent of the original value within the first two or three weeks and continued to decrease, whereas plasma vitamin A values remained unchanged.

Discussion

Wald et al.[35] showed that subjects saturated with vitamin A did not develop signs of vitamin A deficiency even after a period of about six months on a diet limited to 100 international units or less daily. Within slightly more than a week after the deficient diet had been begun, the plasma carotenoids dropped from normal to extremely low levels. The plasma vitamin A levels, however, maintained the initial maximal values throughout the entire deficiency. Our findings are in accordance with the results of these authors and similar observations reported by Brenner and Roberts.[36]

The lack of noticeable changes in vitamin A plasma levels coincident with vitamin A restriction, however, does not exclude the possibility of a reduction of the vitamin in body stores that might be biologically effectual prior to a measurable decrease in plasma vitamin A levels. Lindqvist[37] observes that functional changes that are undetectable by available methods may occur before a decrease of the plasma vitamin A levels and other typical deficiency symptoms become apparent.

Furthermore, the possibility that the carotene itself had a direct influence on skin metabolism must be considered. It has been pointed out that the conversion of carotene to vitamin A probably occurs in other tissues besides the liver[38, 39] and that the carotene may have biologic functions in addition to being the precursor and main source of vitamin A.[39–41]

It should again be emphasized that the restricted diet used in this study included a normal amount of fat. This eliminates the possibility that a decrease of the cellular fat content of the epidermis thought to be achieved by the Grütz–Bürger low-fat diet is the specific mechanism responsible for the favorable reaction of psoriasis to the low vitamin A diet.

No definite statement, however, can be made regarding whether or not stimulation of keratinization due to vitamin A restriction is the basis for the observed improvement. Further investigation of these problems is necessary.

Summary

Eleven patients with severe and persistent psoriasis vulgaris were maintained on a restricted diet allowing 150 to 300 international units of vitamin A daily. Seven patients showed complete clearing of the lesions, 2 marked improvement, 1 slight improvement and 1 no improvement. Relapses occurred in 7 previously improved patients consequent to the resumption of a normal unrestricted diet or supplementation of the restricted diet with carotene.

The values of the plasma carotene and vitamin A levels determined in 6 cases while the patients were on the restricted diet are compared with those of 26 normal persons and 25 psoriatic patients on an unrestricted dietary regime.

The theoretical basis of this study and the related problems of carotene and vitamin A metabolism are discussed.

This dietary restriction is not considered a practical therapeutic regime. It affords an opportunity for further investigation of the metabolic aspects of psoriasis.

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TIME OF ELECTION FOR ABDOMINAL SURGERY IN CHILDHOOD*

EDWARD J. DONOVAN, M.D.†

NEW YORK CITY

THE majority of abdominal surgical conditions in children under one year of age are due directly to some developmental anomaly. Infection, which plays a minor role in the abdominal surgery of the first year of life, subsequently forms the basis of many pathologic processes as it does in adult life. The processes found in infants are identical with those observed in adults, except that they are modified by conditions peculiar to early life. The modifying factors are often not entirely a disadvantage to the surgeon, for an infant's failure to co-operate makes the examiner observe more carefully and judge more keenly.

The process of growth and development has a definite effect on the course of many diseases in infancy and childhood. These factors frequently make disease sudden in its onset, short in its course and more intense in its manifestations. These same processes, however, often come to the aid of the surgeon, as they do in overcoming by growth the malalignment of a fracture or in the spontaneous healing of an incisional hernia.

It has been stated, and I believe quite without justification, that diagnoses are much more difficult to make in children than in adults. It is true that the surgeon must make his diagnosis not only without the co-operation of the child but also, at times, in spite of the child's efforts. I believe that if the examiner follows a definite pattern in his examination, seizing his opportunities as they present themselves and first of all gaining the child's confidence by not hurting him, the effort will be highly successful.

Anyone who considers an infant as a small edition of an adult will encounter many difficulties. Children tolerate the loss of fluid, particularly blood, much worse than adults do. Gentle handling of the tissues, with careful hemostasis, is one of the first rules of abdominal surgery in childhood. Infants resist vigorously up to a certain point, but it should not be forgotten that there is a definite limit to the amount of surgery that a baby can tolerate. There is practically no indication for the exploratory laparotomy performed in adults, nor is there any abdominal condition so acute that the child need be operated on before he is properly hydrated. Many an excellent operation has been spoiled because the baby was dehydrated, anemic, exhausted and in no condition to stand the operation when it was performed, whereas a delay of perhaps an hour or two would have made success unquestionable.

This paper deals with the time of election for abdominal surgery of children. That there is a time of election for many operations goes without saying. The scope of such a title, however, makes it necessary for me to group many of the more frequent conditions since time does not permit a more detailed description of many of them.

The earliest emergency, which requires attention when the baby is but a few hours old, is hernia into the umbilical cord. The sac of the hernia, made up of amnion and peritoneum, is so thin, that, when it gets dry, it cracks and thereby permits infection to enter the peritoneal cavity from the outside. Many of these infants are operated on when they are less than twelve hours old. The umbilical vessels are ligated within the peritoneal cavity, the sac cut away, and the defect in the abdominal wall closed with through-and-through silk sutures.

A much more serious condition, making itself evident when the baby receives his first drink of fluids, is congenital atresia of the esophagus. In 85 per cent of cases the anomaly consists of an upper, closed esophageal pouch, completely separated from the lower pouch, that communicates with the trachea at or near the bifurcation. In the

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†Associate professor of surgery, Columbia University College of Physicians and Surgeons; attending surgeon, St. Luke's Hospital and Babies Hospital.

presence of great distress when the baby is first fed, atresia of the esophagus should be suspected; the suspicion is confirmed if the passage of a catheter encounters a complete obstruction 12 to 15 cm. from the anterior alveolar margin. Such infants should have an immediate operation. If the diagnosis is not made before the age of three or four days, aspiration pneumonia will have occurred when the surgeon is ready to operate, owing to the aspiration of secretions from the upper esophageal pouch. Although an exploration may be done with local anesthesia, every hour that is saved in making the diagnosis improves the chances of survival. The ideal operation is end-to-end anastomosis of the two esophageal segments. Unfortunately, this is not always possible to accomplish because of the shortness of the upper esophageal pouch. Anastomosis, if done with the slightest pressure on the suture line, almost always fails.

Pyloric stenosis occurs about seven times more frequently in boys than in girls and often in the first child of the family. The Fredet–Ramstedt operation is curative and should be done just as soon as the diagnosis has been made by palpation of the tumor and as soon as the baby is completely hydrated. The tumor must be felt in every case of pyloric stenosis. If such a criterion is not established, many infants are needlessly operated on for pyloric stenosis.

Congenital obstructions of the duodenum may be divided into two main groups, depending on whether the obstructive lesion is in the lumen of the duodenum (intrinsic) or due to some extraluminal condition (extrinsic). The extrinsic lesions are duodenal bands, volvulus and fixation of the duodenum in an abnormal position. These lesions usually start as incomplete obstructions and become complete perhaps while the baby is in the hospital for observation. The intrinsic lesions comprise diaphragm or membrane, atresia of the duodenum and stenosis of the lumen, and usually give symptoms of complete obstruction immediately after birth, requiring an extensive abdominal operation when the infant is but a few hours old. Success with this type of surgery depends on how quickly the diagnosis is made and on the thoroughness of preparation before operation.

The diagnosis of intestinal obstruction in the newborn may be made by the taking of a flat plate of the abdomen. The site of obstruction is often determined in this way from the configuration and distribution of gas shadows, but it is rarely possible to state exactly what the cause of obstruction is. Any patient with intestinal obstruction should be operated on without delay, for an hour or two frequently makes considerable difference in the success of the operation. I should like to emphasize the use of the plain film rather than to delay operation to take x-ray films using barium or some other medium. All the information necessary may be obtained by a plain film. Mixtures, such as barium, are dangerous in a potential intestinal obstruction, since an incomplete obstruction may thereby be made complete. Lipiodol is often used instead of barium in the x-ray study of duodenal obstruction because there is no danger of its causing obstruction.

Idiopathic intussusception is one of the most frequent surgical emergencies in early life. About 90 per cent of cases occur in male infants between the ages of five and eighteen months. The history is typical in practically all cases and often helps in establishing the diagnosis. A typical history shows a sudden onset of acute abdominal pain in a healthy, vigorous male child. This is followed by the passage of blood and bloody mucus by rectum. The diagnosis is made by palpation of the typical sausage-shaped abdominal mass. It has been wisely stated that every hour over twelve hours that an intussusception remains unreduced decreases materially the surgeon's chances of reducing it. Again, the x-ray diagnosis of intussusception is not necessary and only apt to delay the operation.

Every patient with congenital obstruction of the bile ducts should be operated on as soon as the diagnosis has been made, in the hope that sufficient extrahepatic-duct system is present to make it possible by anastomosis to deliver the bile into the intestinal tract. Unfortunately, enough of the duct system is not present in many cases. Any part of the extrahepatic-duct system may be absent. If there is delay in operation the duct obstruction may cause an extensive cirrhosis of the liver, even though it has existed but a few weeks.

Great progress has been made in the past few years in the surgical treatment of congenital diaphragmatic hernia. This diagnosis may also be made by x-ray study of the chest. Every patient who has either small or large intestine in the chest is a potential candidate for intestinal obstruction — one of the worst complications that can happen in diaphragmatic hernia. These patients should be operated on as quickly as they can be prepared for operation. We have successfully operated on several young infants who were often in such respiratory distress that they were taken to the operating room in an oxygen tent. They were anesthetized, and an intratracheal catheter was inserted; and the operation was carried out without incident.

No discussion of this subject would be complete without mention of the care of inguinal and umbilical hernia and undescended testis — conditions that cause many serious problems in the first year of life. A great many umbilical hernias are found in infants with rickets, and many of them heal spontaneously without operation up to the age of four years. For this reason, operation is not performed — unless the hernia shows signs of incarceration — until the child is four years old. Few umbilical hernias heal spontaneously after that age. Similarly, many congenital inguinal hernias heal

spontaneously during the first year of life. The indication for operation in the first year of life, therefore, is that the hernia becomes incarcerated frequently. After the first year few inguinal hernias heal spontaneously, and the patients should be operated on. The results are excellent, since recurrence in a child is almost unheard of. In my experience many undescended testes do not descend to the scrotum because of a mechanical abnormality, and hormone injections are useless. All patients with undescended testes should be operated on before puberty, since the testicle undergoes its greatest development at that time, and there is much more chance of proper growth if the testicle is in the scrotum when puberty occurs. The ideal age for operation is between eight and twelve years. A Torek operation is done in all cases, since the results are far better than those obtained with other methods.

Acute appendicitis may occur at any age: several cases have occurred in infants under one year of age, and many cases have been observed in adults as old as eighty-eight and ninety years. The history in infants and children is exactly the same as that in adults: in practically all cases the onset occurs with epigastric pain that in about six hours localizes in the right lower quadrant and is followed by vomiting. The temperature is apt to be no higher than 101°F., and the white-cell count is almost always increased to 15,000 or 20,000, with a predominance of neutrophils. Abdomnal examination almost always reveals general tenderness and muscular rigidity, but the most important of all abdominal signs is the definite local tenderness over McBurney's point, often accompanied by rebound tenderness. Operation should be done immediately, for delay converts a simple operation into a complicated one. The only point about the operation that I wish to stress is the use of the McBurney incision in all male children and in all female children up to the onset of the menses. After that time one must be more cautious in using the McBurney incision in girls, since many pelvic conditions simulate acute appendicitis and cannot be properly cared for through a McBurney incision. Nothing can overcome the difficulties caused by delay in diagnosis. A child with a ruptured appendix and general peritonitis in the hands of a master surgeon is not so well off as one whose appendix is removed before rupture, perhaps by a surgeon of much less skill. Although I do not like to operate on patients unnecessarily, I believe in giving the child suspected of having acute appendicitis the benefit of the doubt in every case.

Another group of conditions well worth considering is that associated with gross hemorrhage from the intestinal tract in infancy. The first to be mentioned in this category are intestinal polyps, which are often found singly in the rectum but may be found in any part of the colon. Those in the rectum are almost always palpable on digital examination or at least may be easily found by proctoscopic examination. The diagnosis of polyps higher in the colon may be more difficult, but usually they can be seen on the x-ray film if double contrast mediums are used. Meckel's diverticulum is often the cause of an intussusception or other form of intestinal obstruction but frequently first makes its presence known when the child has a serious intestinal hemorrhage. Meckel's diverticulum often contains gastric mucous membrane that becomes ulcerated, causing serious hemorrhage. Unfortunately, x-ray examination is of no help in the diagnosis of Meckel's diverticulum, which must be made by the exclusion of other possibilities and by surgical exploration. It should not be forgotten that this condition is one of the most frequent causes of gross intestinal hemorrhage in childhood.

Another interesting member of this group is duplication of the small intestine, a potent cause of gross intestinal bleeding. Such duplications are also called enterogenous cysts and are the result of the development of embryonic rests. They are usually found in the terminal ileum at about the point where Meckel's diverticulum occurs, but differ from the diverticulum in that they are found in the mesentery of the intestine that they parallel, whereas Meckel's diverticulum is always found on the antimesenteric border of the intestine. The important thing to remember about duplications is that they are developed in the mesentery and have the same blood supply as the bowel that they parallel but frequently do not have the same type of mucous membrane. They often contain gastric mucous membrane and are the site of hard, indurated, chronic gastric ulcers. Because they have the same blood supply as the bowel, they cannot be removed without compromising the blood supply and therefore necessitate resection with the parallel intestine. Many duplications communicate with the bowel, but others do not. Again, they do not show on the x-ray film but must be seriously considered if the patient has had a gross intestinal hemorrhage.

Duodenal ulcers occur in children but not nearly so often as they do in adults. The diagnosis must never be forgotten, since the ulcer may well be the cause of severe hemorrhage, as in adult life.

* * *

I hope that I have made it clear that abdominal surgery in childhood differs considerably from that in adults and that infants and children are excellent patients for carefully planned and promptly executed abdominal operations. They respond most satisfactorily to gentle handling of their tissues and will recover in spite of the greatest odds if they are given a chance.

862 Park Avenue

ALLERGIC MANIFESTATIONS AFTER THE INJECTION TREATMENT OF VARICOSE VEINS*

ELIZA A. MELKON, M.D.,† AND DOROTHY K. SCHEIDELL, M.D.‡

BOSTON

THE treatment of varicose veins by the injection method started in Europe, being used in 1904 by Tavel and in 1912 by Linser. During and after World War I numerous sclerosing agents were employed by Sicard and Gaugier, Montpellier, Genevrier and Dowthwaite, Noul and Troisier. Melkon[1] reviewed the history of the treatment of varicose veins in a paper published in 1929. Since then, various sclerosing agents have been used by many surgeons who gave injections freely and without too much consideration of possible dangers. It is time to call attention to the possible dangers in the use of sclerosing material.

The recent trend in the management of varicose veins is surgical, with high and multiple low ligations and divisions of the long and short saphenous veins and their branches or high and low ligation and stripping of the saphenous veins, and this has eliminated numerous injections; nevertheless, the use of sclerosing agents for postoperative cases, certain types of varicose veins and internal hemorrhoids is still frequent. Various sclerosing agents have been employed in this country, but we speak only of those formerly and at present in use at the New England Hospital for Women and Children and the Mount Auburn Hospital: a 20 to 25 per cent solution of sodium salicylate; an 18 to 25 per cent solution of sodium chloride; quinine hydrochloride and urethane; sodium morrhuate; and Sylnasol. A good sclerosing agent must be safe, effective and painless. Sodium salicylate and sodium chloride solutions, which were first used, were good sclerosing agents and were also safe; they caused cramps after the injection, however. Then, in succession, quinine hydrochloride and urethane, sodium morrhuate and Sylnasol, were employed.

There are numerous references in the medical literature to the allergic reaction of sclerosing reagents. In 1936 Lewis[2] reported anaphylaxis due to sodium morrhuate, and in 1937 Dale[3] reported a reaction to the same drug. Subsequently, Holland,[4] McCastor and McCastor[5] and Praver and Becker[6] described reactions to sodium morrhuate. In 1940 Kadin[7] stated that these dangers could be eliminated by the routine skin testing of all patients prior to injection. But in 1941 Rosenzweig, Ascher and Zlatkin[8] reported 938 cases, with reactions in 16 cases, of which 2 gave positive and the other 14 gave negative skin reactions.

The purpose of this paper is to report eight episodes (in 6 patients) of constitutional anaphylactic-like reactions that occurred following the injection of varicose veins with quinine hydrochloride and urethane, sodium morrhuate and Sylnasol. These cases occurred in the twenty years from 1926 to 1945, inclusive. During that time 3037 other patients were treated with no reactions. Most of these allergic reactions occurred in patients who had received injections of sclerosing solutions at intervals of several months. Two patients received quinine hydrochloride and urethane, 3 sodium morrhuate, and 3 Sylnasol. Although three different solutions were injected, the allergic reactions were similar.

The following are brief abstracts of these cases.

CASE 1. M. R., a 32-year-old nurse, was first seen on January 2, 1929, because of pain and cramps in the left leg. There was no history of allergy. Physical examination was negative except for medium-sized varicose veins on both legs. The blood pressure was 110/70.

At weekly intervals 1 to 1.5 cc. of quinine hydrochloride and urethane was injected into the varicose veins, and at the end of the 6 weeks all the previously injected veins had been obliterated. There were no constitutional or local allergic manifestations. Four weeks later the patient received 1.5 cc. of the same agent. Immediately after the injection she complained of feeling ill and warm. She rapidly went into collapse; the pulse became rapid and weak; the respirations were shallow, and the blood pressure was 40/0. The eyes became congested and puffy, and the pupils were dilated. An urticarial rash appeared on the face and neck and then on the entire body. She complained of severe headache and numbness of the nose and lips, as well as belching, nausea and vomiting. She was extremely weak but did not lose consciousness. A subcutaneous injection of 0.5 cc. of a 1:1000 solution of adrenalin was given immediately, and the dose was repeated in 30 minutes. Also, 4 cc. of spirits of ammonia in water was given by mouth, and cold wet compresses were applied to the forehead. The attack lasted about 1 hour; the pulse, blood pressure and respirations gradually returned to normal. The urticaria began to disappear, and the headache, nausea and vomiting ceased. After resting for 3 hours the patient was allowed to go home. On the next day the patient telephoned that she was slightly weak but otherwise had no symptoms.

Approximately 9 years after the allergic episode, bilateral high ligation and division of the long saphenous vein were done to relieve pain and heaviness of the legs. No further injections were given.

The patient was seen again 7 years later, when examination disclosed a few medium-sized varicose veins above the left external malleolus. On the assumption that she was allergic to quinine hydrochloride and urethane but would be able to take Sylnasol, 0.5 cc. of the latter drug was injected after negative scratch and intradermal tests. The scratch test consisted of incision of the skin with a cutting-edge needle just deeply enough to penetrate to the dermis. A drop of full-strength Sylnasol was placed over the area and gently rubbed in, and the area was observed for 15 minutes. Then, 0.1 cc. of a 1:10 dilution of Sylnasol was injected intradermally, and the area was likewise observed for 15 minutes. One hour after the first injection a second injection of 0.5 cc. of Sylnasol was given. The patient returned in 1 week and received 1 cc. of Sylnasol with no reaction. A week later 1 cc. of Sylnasol was again injected. Immediately after the injection she had an attack of allergy similar to the

*From the New England Hospital for Women and Children.

†Chief of vascular diseases of lower extremities, New England Hospital for Women and Children; chief of vein clinic and junior surgeon of vascular diseases, Mount Auburn Hospital.

‡Assistant surgeon, New England Hospital for Women and Children.

reaction, 15 years previously, to the quinine hydrochloride and urethane injections.

CASE 2. J. K., a 40-year-old housewife, was seen on June 14, 1937, because of an ulcer above the internal malleolus of the left leg and marked varicosities on both lower extremities. There was no history of allergy. Physical examination was negative except for the ulcer and the varicose veins. The blood pressure was 118/80.

The patient was advised to have bilateral high and low ligations and divisions of the saphenous veins, but she refused and wished to have the varicose veins injected while she was receiving treatment for the ulcer once a week. At the first visit 1 cc. of quinine hydrochloride and urethane was injected, at the second visit 2 cc., and at the third visit 2 cc. At the fourth visit the previously injected varicose veins were obliterated, and the ulcer was almost healed. A few minutes after the injection of 2 cc. of quinine hydrochloride and urethane the patient began to feel warm and weak. The face and neck became red. Shortly thereafter there was a generalized urticarial rash, the pulse was rapid, the blood pressure fell to 60/0, the respirations were shallow, the eyes were congested and the lids puffy, and the pupils were dilated. Immediately, 0.5 cc. of 1:1000 solution of adrenalin was injected subcutaneously. One teaspoonful of spirits of ammonia in water was given by mouth, and cold wet compresses were applied to the head. The injected leg was lowered, and a tourniquet applied to the thigh for 10 minutes. The attack lasted 30 or 40 minutes. Gradually, the rash began to fade; the pulse, blood pressure and respirations became normal. The patient was allowed to go home after resting for 2 hours. She had no constitutional or local effects on the following day. Three months later bilateral high ligations and divisions of the long saphenous veins were performed. No further injections were given.

CASE 3. W. S., a 60-year-old housewife, was admitted to the clinic on August 2, 1940, because of an ulcer on the right leg and varicose veins on both legs. The varicose veins were injected with 1.0 to 1.5 cc. of quinine hydrochloride and urethane solution. This was repeated five times at weekly intervals. The patient showed no allergic manifestations.

On March 23, 1943, the patient returned to the clinic. At that visit and again on April 12, April 26 and May 3 she received injections of 1.0 to 2.5 cc. of sodium morrhuate. There were no reactions to these injections. Two weeks later however, a few minutes after the patient had been given an injection of 2 cc. of sodium morrhuate, she stated that she felt warm and weak. There were blotches of urticarial rash covering the entire body, the pulse became weak and rapid, and the blood pressure fell to 60/0. Immediately, 1 cc. of a 1:1000 solution of adrenalin was injected subcutaneously. The injected leg was lowered, and a tourniquet was applied at the thigh for 10 minutes. The attack lasted for 30 minutes, after which the pulse and blood pressure gradually returned to normal. The skin rash began to fade, and after resting for 1 hour the patient was allowed to return home by automobile. On the next day she reported that she felt weak and had some pruritus.

CASE 4. J. W., a 29-year-old housewife, was seen in the clinic on December 3, 1937, because of cramps in the legs. There was no history of allergy. Physical examination revealed a normal pregnancy of 7½ months' duration and tortuous varicose veins on both legs. The blood pressure was 110/70. Because of the pregnancy she did not receive an injection, and elastic stockings were prescribed.

On April 22, 1938, the patient returned to the clinic, and a series of four injections of sodium morrhuate were given at weekly intervals. She did not return to the clinic again until January, 1940, when she was given 1.5 cc. of sodium morrhuate, followed by injections of 1.5 to 2.5 cc. of the same drug every 1 to 3 weeks until November 22. At that time, her seventeenth visit since January, 2.5 cc. of sodium morrhuate was injected in two doses, about 2 minutes apart. Immediately following the second injection she complained of pains in the legs, dizziness, weakness and a warm sensation. The pulse was weak and rapid. In about 15 minutes a marked urticaria all over the body and edema of the eyelids and face developed. The patient was given 0.3 cc. of a 1:1000 solution of adrenalin solution, and 15 minutes later received 1 cc. of the same medication. The attack lasted for 1 hour; at the end of that time the urticaria and edema had disappeared.

In 1942 this patient received four injections of sodium morrhuate without a reaction.

On November 5, 1943, the patient again returned to the clinic and was given 1 cc. of Sylnasol. On November 12 she received 2 cc. of Sylnasol; about 2 minutes after the injection she complained of feeling warm, faint and weak. The pulse was rapid and weak; the blood pressure was 80/0. Fifteen minutes after the injection a fine urticarial rash developed on the hands and arms. The patient was given 1 cc. of a 1:1000 solution of adrenalin, followed by 1 cc. of Coramine. The attack subsided in 1 hour. No injections have been given since this reaction.

CASE 5. D. L., a 38-year-old housewife, was seen in the clinic on July 30, 1937, complaining of pain in both legs. There was no history of allergy. Physical examination revealed many large varicosities of the entire lower extremities. The blood pressure was 114/70. Bilateral high saphenous-vein ligations were done. During the year the patient received thirteen injections of sodium morrhuate. Seven injections were given in 1938, and three injections in 1941, each consisting of 2.0 to 3.5 cc. In 1942 she had eight injections. None of these injections caused any reaction. Three weeks after the dose on June 19, 1942, a ninth injection of 2 cc. of sodium morrhuate was given in two doses. Immediately afterward the patient felt hot and weak, and an urticarial rash developed all over the body. The pulse was barely perceptible, and the blood pressure was 80/40. She was given 1 cc. of a 1:1000 solution of adrenalin. In 1 hour the reaction had largely subsided.

CASE 6. V. D., a 36-year-old housewife, was seen on December 7, 1944, because of pain and cramps in the right leg for the previous 5 years. The past history was negative for allergic diseases. She had observed a tendency toward fainting and dizziness on several occasions. She had had phlebitis of the right leg after delivery of a child 7 years previously. Physical examination disclosed a well developed and obese patient. The chest and abdomen were normal. The blood pressure was 110/60. Both legs were covered with large saccular and tortuous varicose veins.

On March 3, 1945, bilateral high and multiple low ligations and divisions of the saphenous veins were done. Two weeks later, after a negative skin test, four injections of 1 to 2 cc. of Sylnasol were given at weekly intervals. Most of the varicose veins were obliterated, and the leg pain and cramps disappeared. There were no constitutional or local reactions. On November 30, 1945, when the patient returned for a follow-up examination, there were a few small varicose veins on the anterior aspect of the right leg. Injections of 1.5 cc. of Sylnasol were given in two places. One week later 2 cc. of Sylnasol were injected in three places. A few minutes after the injection the patient felt warm, weak and dizzy. A red rash appeared over the entire body. The pulse became weak and rapid and was hardly perceptible. There was moderate dyspnea. The blood pressure was 40/0. The eyes became congested, and the lids puffy. The patient complained of a severe headache and had nausea and vomiting. A subcutaneous injection of 0.5 cc. of a 1:1000 solution of adrenalin was given, and this dose was repeated in 20 minutes. A tourniquet was applied to the thigh for 10 minutes, and 1 cc. of Coramine was injected subcutaneously. The attack lasted for 1 hour, and then all subjective and objective symptoms gradually disappeared. After resting for 4 hours the patient was allowed to go home by automobile. On the next day she was up and around, but still rather weak.

* * *

In this series of cases the constitutional and allergic reactions occurred with dramatic suddenness. None of the patients had had a history of allergic manifestations, such as asthma, hay fever and urticaria. Two patients gave four negative skin tests; in the other 4 the skin tests were not done. Most of the patients had received injections of sclerosing solutions at preceding intervals of a few

months or more. Most of the severe reactions occurred after a temporary cessation of treatment, and in all cases the allergic manifestations appeared within one to five minutes after an injection. The patients had urticarial rash and were warm and weak, with rapid pulse, low blood pressure and puffy congested eyes, and in 2, nausea and vomiting occurred. None of the patients lost consciousness. The patients with the lowest blood pressures appeared to have the severest reactions. Two patients had allergic shock from quinine hydrochloride and urethane, 3 from sodium morrhuate, and 3 from Sylnasol. The symptoms were the same regardless of the drug used.

There are many theories concerning the phenomena of anaphylaxis and allergy. Of these, one has been advanced by Sir Thomas Lewis,[9] who assumed that the union of antigen and antibody in the tissues caused an irritation in or on the cells of the tissues, with the resulting liberation of a histamine-like substance that produced the physiologic effect characteristic of anaphylaxis or allergy. Zimmerman[10] believed that sclerosing solutions may mix with the liver protein and produce allergic reactions. A theory has been advanced that hemolysis occurs, contact of the susceptible patient's blood with the solution resulting in liberation of a protein substance that causes the reaction. K. M. Lewis[2] suggests that sodium morrhuate acts as a hapten and sensitizes susceptible persons, particularly if they have received an injection one or two weeks previously. Criep[11] states that a patient may become hypersensitive to the drug if more than seven or ten days elapse between injections. Drug allergy is not identical with protein allergy, since the development of sensitivity appears to be dependent on the combination of the drug with a body protein. The exciting agent in true anaphylaxis is always a soluble protein. In acquired allergy, this is not necessarily so, for many nonprotein substances, such as drugs, are capable of acting as allergens.

It seems probable that the substance released from the union of antigen and antibody in the cells of the tissue is a histamine-like substance that either acts directly as a vasodilator on the smooth muscles of the small vessels or depresses the vasoconstrictor sympathetic nerves, thus increasing the permeability of the arterioles and producing a generalized skin rash and a low blood pressure.

Summary

Eight attacks of allergic manifestations in 6 patients following the injection treatment of varicose veins are reported, and the possible explanations for these reactions are briefly discussed.

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MEDICAL PROGRESS

RUBELLA (GERMAN MEASLES)*

CONRAD WESSELHOEFT, M.D.†

BOSTON

AT THE annual meeting of the Ophthalmological Society of Australia in 1941 Gregg[1] reported a series of congenital cataracts in 78 cases following attacks of rubella in the early months of pregnancy. Since then, numerous studies have been made regarding the prenatal influence of this disease with results indicating that the fetus may suffer a variety of defects leading to serious congenital malformations or that the fetus may be destroyed in utero with consequent miscarriage or stillbirth. Thus it is that a disease hitherto considered to be of little consequence and to require only differentiation from other exanthems has become a serious problem in obstetrics, medicine and public health. It is the purpose of this review to look backward through the history of rubella, to sum up the present knowledge of its pathogenesis, and to consider the numerous problems with which we are now confronted.

TERMINOLOGY

According to Emminghaus[2] rubella was first described by two German physicians, de Bergen in 1752 and Orlow in 1758. There followed numerous others who called attention to its manifestations under various terms but eventually under the title of *Roetheln*. This term was used both in England and in America, and it is under this heading in the first series of the *Index Catalogue of the Library of the Surgeon General's Office*. Owing to the early interest displayed by German writers and the acceptance of the term *Roetheln*, this disease came to be known as "German measles." In 1866 Henry Veale[3] introduced the term "rubella," which is now accepted in English-speaking countries, and one to be encouraged for the simple reason that this disease is not a German form of measles or any other form of measles, but rather a distinct entity unto itself.

The terminology of rubella in different countries has been and still is a cause of confusion. The trouble lies in the historical background. The early German writers considered it to be a modified form of either measles or scarlet fever. Schönlein[4] regarded it as a hybrid of both and gave it the name "rubeola" to distinguish it from "morbilli" or true measles. Eventually, rubeola came to be used to designate measles, but to this day *Rubeola* is used in Sweden and *rubéola* in Spain for rubella. In France the term is modified to *rubéole*, and even in Austria *Rubeolae* is sometimes used in place of *Roetheln*. Consequently, in investigation of the literature, or in conversation with foreigners, it is necessary to keep these synonyms in mind.

While German authors wrangled over the relation of rubella to measles and scarlet fever, Willan,[5] in England, described the condition as *rubeola sine catarrho* and remarked that "persons receiving the miasm in this form are peculiarly liable to a second attack of measles." In the next year, 1814, Maton[6] in a paper read before the Royal College of Physicians described rubella as a disease entity. In 1840 Paterson,[7] "unaware of any description of this disease in our language," entered into a historical review and proceeded to confuse it with scarlet fever and measles, citing among his cases a number of fatal ones. In 1940 an editorial in the *Edinburgh Medical Journal*[8] entitled "One Hundred Years Ago" took Paterson's remark at its face value to the neglect of Maton's excellent observations.

John Homans,[9] a president of the Massachusetts Medical Society, is credited with being the first physician in America to describe rubella. This he did in an unpublished paper before the Boston Society for Medical Improvement on April 14, 1845. Cotting,[10] who was present at this meeting, presented a paper on the same subject in 1853 before the Norfolk District Medical Society. This was incorporated in a subsequent address delivered twenty years later, constituting the earliest published account of the disease in the United States. At that time an active interest in the disease had sprung up in this country, headed by J. Lewis Smith,[11] who contributed to the symposium on rubella at the International Medical Congress in London in 1881 — the only occasion on which this disease ever received so much attention. The interest culminated in the two classic works by Atkinson[12] and Griffith[13] in 1887, and that of Corlett[14] in 1902. A characteristic article of this period was written by Townsend[15] in 1904. This author withdrew his previously expressed skepticism of the identity of rubella and described an epidemic in Boston, with a description of his cases. A comprehensive account was given by Schamberg and Kolmer[16] in 1928. Throughout this era attention was given to establishing the entity of rubella, its symptomatology and course, and its differentiating characteristics. Nowhere in the literature prior to

*From the Harvard School of Public Health and the Haynes Memorial, Massachusetts Memorial Hospitals.

†Clinical professor of infectious diseases, Harvard School of Public Health; professor of clinical medicine, Boston University School of Medicine.

1941 have I been able to find any trace of evidence that rubella in the course of pregnancy is a source of danger to the fetus. The latest extensive paper covering rubella appears in Christian's *Oxford Medicine*.[17]

Etiology

The causative agent of rubella is a filterable virus. In 1938 Steinmaurer[18] claimed to have demonstrated the virus with the fluorescent microscope and to have isolated it on the chorioallantois of the egg embryo, but the evidence presented is by no means convincing. Hiro and Tasaka[19] collected physiologic saline washings of the nasopharynx during the eruptive stage. The filtrate was injected subcutaneously into a group of 16 nonimmune children convalescing from chronic disease, of whom 4 exhibited a characteristic rubella rash, and 2 showed typical lymphadenopathy without any skin eruption. The incubation period was seven days in 3 cases, and eight, eleven and seventeen days in the others. Habel[20] used similar nasal washings obtained within twelve to twenty-four hours after the appearance of the rash. The filtrate was introduced by the intranasal, subcutaneous, intraperitoneal and intravenous routes into *Macaca mulatta* monkeys. Washings obtained from patients on the third day of the disease yielded negative results, whereas those obtained on the first day gave equally positive results from all four routes, although the monkeys did not always exhibit a rash. Habel also reported successful cultures on the chorioallantoic membrane of the chick embryo, although no specific pathologic lesions were found.

Distribution

Rubella is widely distributed, being found in North and South America, Europe, Africa, Asia, Japan and Australia. Unlike measles it does not appear to be unusually severe when it first strikes on virgin soil.

Age

Rubella, like measles, is rare in the first six months of life. Corlett[14] remarks that "infants have contracted the disease a few days after birth." Measles is usually mild when it occurs at that time, and therefore rubella, if proportionately mild, might easily be missed. I have collected reports of 5 mild cases in infants ranging from eighteen days to two months old.[17] After six months of age rubella takes its usual course, which being milder than measles and of shorter duration is frequently not reported. In fact, a physician may not even be called. In children's institutions the disease spreads freely. Thus, Michael[21] reported 80 cases among 199 children, of whom all those under six years of age contracted the disease. Humphrey and Ekermeyer[22] found that 48 per cent of the children exposed were attacked, whereas Geiger[23] observed an attack rate of 12 per cent among school children. Thus, it appears that in children's institutions rubella exhibits a fairly high attack rate, whereas among day-school children the rate as reported is low. To a certain extent this can be explained as failure in reporting the day-school cases. On the other hand, the rather high incidence of rubella among young adults in colleges and in military life suggests the possibility that more children escape rubella than they do measles. Contagious hospitals usually have more cases of rubella among young adults than among children. This is due to the fact that rubella is not generally hospitalized except when the cases arise in dormitories or barracks. The disease rarely attacks those over forty years of age. Simpson,[24] however, has recently reported a case in an epidemic at Dorset, England, in which the patient was eighty-two years old.

Incubation Period

Maton,[6] Emminghaus,[2] Thomas,[25] Earle[26] and Pospischill[27] all arrived at the approximate figure of eighteen days for the incubation period. Many authors have been content to compile figures given by previous writers along with the addition of their own observations, until 41 series are listed by Schamberg and Kolmer[16] without references and without any discrimination regarding possible faulty diagnoses easily detected in the original sources. As such, these compilations are not only worthless but also misleading. From a single three-hour exposure to the onset of the eruption exactly eighteen days elapsed in a case reported by Lindberg.[28] This figure is confirmed by a chart presented by Aycock and Ingalls[29] of an epidemic at a boys' boarding school.

Period of Infectivity

Since it is now apparent that the virus of some of the acute exanthems resides in the upper respiratory tract during the prodromal period and the height of the eruptive stage, their spread occurs during the prodromal period before a diagnosis has been established and isolation carried out. In measles the predominant catarrhal symptoms with sneezing and coughing cause the air about the patient to be filled with virus-laden droplets. Chicken pox, without such catarrhal symptoms, however, is spread presumably from the upper respiratory tract prior to the eruption.[30, 31]

Isolation of the virus of rubella from the upper respiratory tract during the first forty-eight hours of the eruption[19, 20] lends support to the contention that rubella is spread from the upper respiratory tract. Griffith[13] observed that 63 of his patients in children's institutions contracted the disease in spite of prompt and careful isolation of all cases with the appearance of the rash. Consequently, the period of infectivity appears to precede the eruptive phase. Furthermore, it is highly probable that

with the fading of the rash the period of infectivity terminates as in measles. This is supported by Habel's[20] negative results from nasal washings taken on the third day of the disease and his demonstrations of the virus in the blood of patients bled within twelve, twenty-four and thirty hours of the onset of the rash, but not in blood taken on the third day. Since the rash is often of relatively short duration, isolation precautions established after the appearance of the rash are merely attempts to control the spread during the last part of the period of infectivity. In the light of the available evidence, Geiger's[23] recommendation that cases be isolated for the duration of palpable lymph nodes is hardly tenable, particularly since the postauricular nodes may remain swollen for an indefinite period. Consequently, isolation beyond the period of the eruption is of doubtful value.

Immunity

A lifelong immunity to rubella is usually established by an attack. Late second attacks have been recorded, however.[29] Just how this permanent immunity is established and in what manner it is lost is one of the great problems of virology[32] and cannot be entered into here. Relapses occur and are not to be confused with late second attacks, which are rare. Griffith[13] reported a relapse in 3 cases, once on the eleventh day and twice in the third week. Humphrey and Ekermeyer[22] observed relapses in 19 of 305 cases (6.2 per cent). The relapse, which was usually milder than the original attack, occurred in the third week in 15 cases, in the fourth week in 3, and on the forty-first day after the original attack in 1. These authors are of the opinion that the establishment of immunity is often delayed, allowing reinfection through subsequent exposure during this period of partial immunity. A number of factors may enter into the mechanism of this phenomenon, which I have observed on rare occasions at the Haynes Memorial. Probably the reason I have seen this so rarely is that the patients admitted with rubella during my term of service were discharged before a relapse could take place. On the other hand, when rubella had broken out on a scarlet-fever ward, the patient was sometimes detained because of scarlet-fever complications long enough to suffer a relapse from rubella. In such cases the relapse was identical in severity with the first attack.

Course

Rubella is generally considered to be the mildest of the exanthems. For the most part the patient complains of no discomfort throughout the course of the disease.

In children under observation in a hospital ward a slight rise in the temperature during the twenty-four hours preceding the eruption may be the only prodromal sign. In adults the prodromal symptoms are in proportion to the severity of the subsequent eruption. In the severer cases among adults prodromal fever, headache, muscular aches and pains and the characteristic enlargement of the lymph nodes have been encountered. Anorexia, nausea and vomiting are rare.

The blood picture in the prodromal stage is of peculiar interest. A marked leukopenia is sometimes observed, both in children and in young adults, but this phenomenon is by no means constant. On two occasions, however, we have correctly suspected the diagnosis prior to the eruption through known exposure and white-cell counts of about 2000. In the eruptive stage this leukopenia is apt to shift to a lymphocytosis, along with the appearance of a few monocytes. Careful blood studies by Lindberg[28] failed to yield any blood findings of diagnostic value because of the wide variability. Hynes[33] carried out serial white-cell counts on 61 adult patients; these generally showed an absolute leukopenia at the onset, changing to an absolute lymphocytosis on the sixth day and a neutrophilic leukocytosis after ten days. These findings offered no difference from those observed in measles. During the first week an increased sedimentation rate was observed in a quarter of his cases.

At the Haynes Memorial Hospital 1046 patients have been admitted for rubella. Only 5 of these were admitted prior to the beginning of my term of service, and I was one of them — rubella being the only disease that I have acquired from my work at this hospital. Besides these admissions there have been a number of outbreaks of rubella in the convalescent scarlet-fever wards. None of these patients suffered any serious complications, with the exception of 2 who were admitted with rubella encephalitis and 1 mild case of encephalitis that developed six days after the onset. One patient in the third month of pregnancy miscarried spontaneously on the sixth hospital day. The bulk of the adults were college students, patients referred from the armed forces, student nurses and interns from our own and other hospitals.

The exanthem may be ushered in by a brilliant generalized erythema of the face, as noted by Pospischill.[27] This lasts for only twelve to twenty-four hours and precedes the severer types of rash. More frequently, the eruptive stage begins with the appearance of small, pale, rose-pink macules that come out first on the face and scalp and spread downward over the trunk and extremities. In the severer cases the macules may coalesce in certain areas, especially over the lower back and buttocks. Only in severe cases are macules found in the axillas, the popliteal spaces, the palms and the plantar surfaces. The severer the eruption, the longer it remains, and in the severe type a coppery tint may appear as in scarlet fever. Such cases may be accompanied by considerable fever and may be followed by a furfuraceous desquamation of the face

and trunk as the rash subsides. Schamberg and Kolmer[16] describe an unusual case in a twenty-seven-year-old nurse with severe prodromal symptoms of fever, chilliness, headache, vomiting and cervical lymphadenopathy that lasted for five days. The macules first appeared below the knees and spread upward, with many crescent formations. Vomiting and fever persisted. The face was finally involved on the third day, and the rash disappeared on the sixth day. The incubation period had been only thirteen days. This case reminds one of the severest type of smallpox, variola purpurica, in which the incubation period is greatly shortened.

In general the macules remain discrete. There are, however, several outstanding characteristics of the disease.

The eruption comes out suddenly on the face, from which it tends to fade rather abruptly in the milder cases, so that on the second day the rash begins to fade from the face, although it is then well marked over the trunk.

The eruption tends to be kaleidoscopic or, as some authors put it, polymorphous. The first term is more appropriate, since the eruption may be macular at first and may then assume a more punctate appearance. Thus, the rash may resemble measles on one day and scarlet fever on the next. The fading of the rash from the face on the second day may suggest scarlet fever, which only rarely involves the face.

Catarrhal symptoms are absent unless due to a secondary infection, such as the common cold.

Conjunctivitis is not constant, but when present is characteristic in that the orbital conjunctivas are involved, giving a suffused pink to the whites of the eyes. This is in marked contrast to the definite palpebral conjunctivitis seen in measles. Photophobia is extremely rare, lachrymation is absent, and there is none of the purulent sticky discharge frequently seen in measles.

Lymphadenitis is particularly characteristic over the mastoid region. These postauricular lymph nodes may be so enlarged as to be not only palpable but also visible from a distance. Klaatsch[34] mentions that on this symptom alone the diagnosis of rubella may be ventured in the dark. In such cases a child may complain of "earache" without any evidence of otitis media, whereas in other cases with similar enlargement of the lymph nodes there is neither pain nor tenderness. The postauricular nodes, however, are not always affected, and the absence of enlargement need not preclude the diagnosis of rubella. Moderately enlarged suboccipital and posterior cervical chains of lymph nodes are frequently palpable, as in measles. Furthermore, there may be generalized prominence of the lymph nodes in the axillas and groins. The enlargement of th postauricular nodes may persist for weeks and even for years.

Fever is sometimes entirely absent. Often, a slight fever extends from the prodromal period through the height of the eruption. In the severe cases there may be chilliness and a temperature as high as 104°F., but for the most part such patients are rarely as uncomfortable as those with proportionately severe measles or scarlet fever.

Forchheimer,[35] of Cincinnati, is responsible for much of the confusion that exists regarding the appearance of the throat in rubella. In 1898 he described the enanthem as small "rose red spots" on the soft palate and uvula that fade away within twenty-four hours, "sometimes leaving a yellowish brown pigmentation." In another article he[36] refers to the enanthem as "small, discrete, dark red, but not dusky papules which disappear in a short time, leaving no trace behind." These diverse descriptions were advanced at the time when Koplik had given his classic account of the throat lesions in measles, which have come to be known throughout the world as "Koplik spots." Consequently, writers on rubella began to refer to "Forchheimer spots." Authors are apt to spell the name incorrectly when they depict the spots according to one or the other of Forchheimer's versions. At times, an author remarks that he has also observed something quite different, whereupon he describes the other condition, entirely ignorant of Forchheimer's other version. The fault seems to lie with Forchheimer, who failed to clarify his position. The fact is that the enanthem if present is fleeting, and is sometimes kaleidoscopic in character like the exanthem. I have had occasion to demonstrate to students both versions as well as perfectly normal looking throats in the course of rubella. Humphrey and Ekermeyer[22] failed to find an enanthem in any of their 305 cases. In my opinion there is nothing pathognomonic about the appearance of the throat in rubella. Bennett and Copeman[37] reported pharyngitis, follicular tonsillitis, congestion of the nose "without catarrh" and soreness of the gums in a severe epidemic in the British Expeditionary Forces. Todd[38] also noted the same soreness of the gums in her own case, "as though her teeth were falling out."

The appearance of the tongue also lacks any diagnostic significance. At times the bright strawberry tip may be observed, but the subsequent prominence of the papillae over the entire surface — frequent in scarlet fever — is never present. Pospischill[27] and Lindberg[28] have remarked on the difficulty sometimes presented in differentiation of the tongue of rubella from that of scarlet fever. I can share this view only so far as to say that the tongue early in mild scarlet fever, as in rubella, often appears to be perfectly normal.

The spleen is sometimes palpable just as it is in some of the other common virus diseases, such as mumps and measles.

Unusual Forms

Rubella ecchymotica has been described by Ström,[39] of Stockholm. This author discusses 2 cases in adults in which the enanthem and exanthem were distinctly ecchymotic in character. Aside from these ecchymoses there was no loss of blood. The patients were not acutely ill, and the blood findings were normal. This type of eruption, which I had occasion to observe in some of the sailors referred from the Coast Guard, as well as in several college students, is due to a lowered capillary resistance. The character of inflammation in the acute exanthem is dependent on the nature of the toxic material present, and it is only by the outward manifestations that the diagnosis of the various exanthems of virus origin can be made. Landis[40] states that the permeability of the capillary endothelium is increased in all types of inflammation. The degree of inflammation brought about is further dependent on the amount of virus present and the spreading factor, both of which influence the resistance offered by the capillary epithelium. In rubella the exhibition of an ecchymotic character in the eruption implies a soil in the skin and mucous membranes that allows greater inflammation with greater permeability of the capillary endothelium but without necessarily augmenting the constitutional toxicity, provided other organs are not involved. These ecchymoses are responsible for the coppery hue that accompanies the fading of a severe eruption alluded to above.

Modified rubella, like modified measles, implies a minimal attack in which the eruption is barely visible or never seen. The diagnosis is established in these cases by the characteristic lymphadenopathy with or without fever, by the circumstantial evidence of exposure with an appropriate incubation period and sometimes by the added confirmation of transmission of the infection to other persons. Lindberg[28] reported such a case without a rash in which the postauricular lymph nodes were markedly prominent. Flöystrup[41] reports the case of his own son, who, after a definite exposure in school, exhibited characteristic lymphadenitis, conjunctivitis, vomiting and slight fever, with only a few pale macules on the cheeks lasting but a few hours. The boy's younger brother, however, contracted a typical attack of rubella from this exposure. The title used by Flöystrup, "rubella without a rash," is misleading, and the case has been used as an example of rubella without a rash, which it is not. Habel[20] reports 2 cases of rubella without a rash, 1 of which is misleading. We have seen measles modified in newborn infants and by the late administration of convalescent serum or gamma globulin when the eruption was exceedingly slight and fleeting. Therefore, although rubella may be modified through high resistance to a point where no rash occurs, it is also possible for a rubella rash to be so fleeting as to escape the observation of the attending physician — just as authors in quoting Flöystrup's case have failed to note that an eruption did take place.

Differential Diagnosis

The greatest difficulty in the diagnosis of rubella has occurred in the differentiation of this disease in its mildest form from modified measles after the late administration of convalescent serum or gamma globulin. One must lean heavily on the circumstantial evidence of exposure, because the usual catarrhal symptoms of measles, as well as Koplik spots, may be absent. Measles with Koplik spots should never present any difficulty.

A mild scarlet fever can make trouble, especially if the patient with rubella is seen on the second or third day when the rash has disappeared from the face and is punctiform. Scarlet fever does not give a rash on the face, except on the forehead and temples. When it does so the eruption is rough and feels like coarse sandpaper over the forehead, and usually is accompanied by a severe rash over the trunk with all the earmarks of scarlet fever. In rubella the throat may be inflamed from heavy smoking or from some secondary infection. At the onset of mild scarlet fever there may be no lymphadenitis, or if present it will be manifested in the anterior cervical chain in contrast to rubella, which involves the postcervical chain and the suboccipital and postauricular lymph nodes. As pointed out above, the tongue at the onset of scarlet fever may not have taken on the characteristic enlargement of the papillae. The kaleidoscopic character of the rubella rash is always helpful. A mild scarlet fever does not always desquamate, but the characteristic late peeling under the fingernails means that the patient has had scarlet fever, no matter how much the disease appeared to be rubella.

In the course of infectious mononucleosis a scattered, pinkish, macular eruption may come out over the trunk and extremities but, unlike rubella, is rarely marked on the face. The fever is apt to be much more prolonged. In the first few days the blood picture in infectious mononucleosis may not differ from that at the onset of rubella, but monocytes will appear in increasing numbers. Moreover, there may be a severe faucial angina with white fibrin deposit. Positive heterophil agglutination tests later on will confirm the diagnosis. A case of complete temporary heart block has been recorded as coming on in rubella, but the case as described might have been infectious mononucleosis.[42]

Erythema infectiosum is most frequently found in Central Europe and is rare in England and America. The incubation period is from five to ten days.[43] The eruption appears first on the face, especially on the cheeks, as a papuloerythema, and

then on the extensor surfaces of the extremities, reaching the trunk last of all. The lesions are polymorphous, sometimes morbilliform or scarlatiniform in appearance and, according to Rolleston and Ronaldson,[43] often tend to be annular or gyrate. There is little or no fever and no lymphadenopathy. Eosinophilia is usually present, and the eruption persists for ten days.

Roseola infantum (exanthem subitum) is not to be confused with rubella. This disease occurs in infants, is attended with a high fever lasting three or four days and is often associated with convulsions. The laboratory findings are essentially normal. Slight generalized lymphadenopathy may be present, but the postauricular lymph nodes are not enlarged. The disease terminates with an abrupt drop of the temperature to normal and the appearance of a rubella-like eruption that promptly fades. The rickettsial diseases, such as typhus and Rocky Mountain spotted fever, may exhibit macular eruptions not unlike those of rubella. Even though no hemorrhagic lesions occur the constitutional symptoms are severe and persistent.

Late serum rashes associated with generalized lymphadenopathy are sometimes confused with rubella. But wheals are apt to develop, as in a generalized nettle rash. Drug eruptions, particularly from the sulfonamides, barbital derivatives and quinine, lack the kaleidoscopic course of rubella. As in the conditions mentioned above, circumstantial evidence is of great importance. Erythema multiforme is differentiated by the prominence of the early eruption on the extremities and the circinate character of the lesions. The irregular form of rubella described by Schamberg and Kolmer[16] and cited above under the discussion of the rubella exanthem certainly needs careful consideration of the circinate type of erythema multiforme.

Complications

Aside from the damage done in early pregnancy, the complications of rubella are exceedingly rare. As in other virus diseases, the menstrual cycle may be disturbed. It may be delayed or brought on early according to our experience, but such disturbance is infrequent. A mild form of polyarthritis may follow a few days after the eruption has disappeared. Lindberg[28] observed this in 6 cases. The knees and feet were involved in 3 cases among children, and the fingers in 3 adult cases. A mild fever accompanied these joint involvements. Potter,[44] however, describes a polyarthritis in a woman that appeared on the third day of the eruption and involved the wrists and fingers, as well as the knees, ankles and feet, and was unaccompanied by any fever. Geiger[23] reported 36 cases of arthritis in approximately 180 cases of rubella in Arkansas. Simpson[24] reported polyarthritis of a mild migrating type in 25 of 72 patients with rubella in England, and Bennett and Copeman[37] noted this complication in the British Expeditionary Forces in the same year. Gregg[1] states that many of the cases of rubella in the epidemic of Australia in 1940 and 1941 showed "rheumatic sequelae." Gülzow[45] reported a case of pancreatitis during the acute stage, accompanied by severe diarrhea and general abdominal pains, along with a rise in the blood diastase.

Thrombopenic purpura in the course of rubella has been reported in 10 cases. Pitten[46] gives an account of a case in a nine-year-old girl with no previous history of bleeding. There was thrombopenia with a prolonged bleeding time. Gunn[47] describes the case of a nine-year-old girl with a previous history of mild nosebleeds since the age of five but with no cutaneous manifestations. This case also showed a thrombopenia with a prolonged bleeding time, but the white-cell count rose to 13,000 with 79 per cent neutrophils. In both cases there was severe and protracted epistaxis with cutaneous purpuric lesions on the trunk and extremities. The spleen was not palpable in either case. Bleeding stopped in both on the sixth day, and uneventful recovery followed. Gunn[47] cites 4 other cases reported in the literature. During 1946 a total of 4 new cases of thrombopenic purpura were reported. Warren, Rogliand and Potsubay[48] report 2 severe cases among soldiers at Fort Dix, both of whom gave negative family and past histories of bleeding tendencies. One followed two days and the other four days after the onset of rubella. Epistaxis, bleeding from the gums, gross hematuria, intestinal bleeding and a palpable spleen were present in both cases. Diminished platelet counts of 30,000 and 40,000 were found. In 1 case the platelets completely disappeared at one time, and the count remained as low as 62,000 at the end of fifty days. In both there was a prolonged bleeding time (30 minutes), as well as generalized petechiae over the skin. A complete recovery followed in five months in one case and in two months in the other. Fox and Walton[49] report 2 mild cases in children. The first occurred in a nine-year-old girl ten days after the onset of a mild case of rubella. The second was in a sixteen-year-old boy, occurring on the fifth day of a rubella that had begun with a temperature of 103°F. Thus, the severity of the rubella attack had no relation to the incidence of thrombocytopenia. In the first case the platelet count was 40,000, the bleeding time was over 45 minutes, and the petechiae were distributed over the body. In the second case the platelet count and bleeding time are not given, but red cells were found in the urine. The petechiae developed rapidly and spread over the entire surfaces of the extremities. The first patient recovered in three weeks, and the second in two weeks. The family histories and the past histories regarding bleeding tendencies were negative.[50]

Rubella encephalitis has attracted considerable attention. It usually comes on between the second and the sixth day after the onset of the rash, and

it may be manifested as a mild meningoencephalitis or as an encephalomyelitis. Thus, the symptoms range all the way from headache and rigidity of the neck to coma and convulsions. There may be diplopia, bulbar palsies, thickness of speech, muscle twitching, weakness of the extremities and retention of urine. Merritt and Koskoff[51] reported 4 cases, Barraclough[52] 2, Davison and Friedfeld[53] 6, and Jack[54] 1. Wingo[55] reported a case in a twenty-four-year-old woman who developed signs of meningeal irritation seven days after the onset of the rash. The spinal-fluid pressure was equivalent to 240 mm. of water, and examination of the fluid revealed 40 lymphocytes per cubic millimeter. Diplopia appeared on the third day of this complication and persisted for four days. Bradford[56] described 2 cases of rubella meningoencephalitis from a British Naval Hospital, both of which showed a spinal-fluid count of 20 cells per cubic millimeter, with a marked preponderance of lymphocytes. One patient recovered in two weeks, and the other in three weeks.

Margolis, Wilson and Top[57] reported 14 cases of post-rubella encephalomyelitis that occurred in Detroit in 1942. They estimated that encephalomyelitis occurred at the rate of 1:6000 cases of rubella. This rate is not unlike that found in measles and chicken pox. In mumps, on the other hand, a benign meningoencephalitis occurs in approximately 10 per cent of cases when carefully looked for, whereas encephalomyelitis is exceedingly rare. These authors do not differentiate cases of meningoencephalitis from encephalomyelitis. Six of their 14 cases were mild and showed neurologic signs for only three days. There were 8 severe cases, in 4 of which the patients died. In these 4 fatal cases the patients did not survive for more than three days. Among those who recovered, 1 showed symptoms for eight days, 1 for ten days, and 1 for over one hundred and twenty days; the last had almost recovered when the paper was written, however. The spinal-fluid pressure was found to be equivalent to from 120 to 180 mm. of water, and the cell counts varied from 8 to 500 per cubic millimeter, averaging 91, with mononuclears predominating. The authors present a protocol that includes their own 14 cases, as well as 37 others culled from the literature, with a combined mortality of 21 per cent.

A unilateral temporary retrobulbar neuritis with diminished vision in the affected eye has been reported by Owen and Greenway.[58] This occurred in the course of "meningoencephalitis" developing five days after rubella in a twenty-six-year-old man. This was really an encephalomyelitis with inability to urinate for seven days. The headache lasted for four and a half days, but aside from these symptoms the patient was not extremely sick and was all well on the sixteenth day. Revilloid and Long[59] report a case of "polyneuritis" in an eight-year-old boy that developed ten days after rubella. There were diplopia and marked weakness of the muscles of the extremities, with loss of tendon reflexes. Complete recovery followed in a few weeks. This case also appears to belong under encephalomyelitis. Hodges and Witney[60] report a total of 15 cases of neuritis following rubella, of which 3 were brachial.

The pathology of rubella encephalitis is described by Davison and Friedfeld.[53] Autopsy disclosed perivascular infiltrations in the gray and white matter of the cortical convolutions, the brachium pontis, the superior cerebellar peduncle, the dentate nuclei, the cerebellum and the brain stem. In this respect the pathology does not differ from other encephalomyelitides.

The origin of the encephalopathies is unknown. One theory held by many is that some latent encephalomyelitic virus is aroused into activity by the virus of rubella. In support of this is the similarity of the symptoms, signs and pathology found in the rubella type and the types that follow measles, chicken pox and vaccinia. On the other hand, Putnam[61] lays great emphasis on the vascular occlusions with thrombosis, which, according to him, form the basis of the pathologic lesions. In his opinion it is possible that some sort of allergic reaction associated with the establishment of immunity takes place whereby the clotting mechanism is disturbed. At any rate, the inflammatory reaction in the brain is not simultaneous with lowered capillary resistance in the skin, because the encephalitic manifestations appear not with the onset of the eruption but usually as it is subsiding or after the rash has entirely cleared up.

Relation to Secondary Infections

Although any concurrent infection may occur during or after rubella it does not appear that this disease in itself tends to predispose to other infections. This statement does not agree with the opinion of Hamburger,[62] who presents charts from an Army hospital to support his contention that patients recovering from rubella show the same well recognized susceptibility of measles patients to streptococcal infections. His experience may well be due to the prevalence of streptococci in that hospital. I have reviewed 100 cases of rubella that occurred among patients convalescing from scarlet fever. There was no evidence of increased susceptibility to any of the complications incident to streptococci in their respective age groups. This is in marked contrast to measles in the convalescence of scarlet fever in which the incidence of suppurative otitis media is greatly increased in all age groups.[63]

Humphrey and Ekermeyer,[22] reporting an epidemic of 305 cases of rubella in children, found tonsillitis in 15 cases, suppurative otitis media in 3 and suppurative cervical adenitis in 2. The last two complications are not given in relation to the tonsillitis. One is led to assume that all three complications were the result of a concomitant beta-

hemolytic streptococcus infection of a nonscarlet-fever-producing strain. In any event, the incidence of 1 per cent otitis media reported in this series is far lower than that found among children with scarlet fever or measles, to say nothing of a combination of the two. Florand and Fiessinger[64] described a case of streptococcal septicemia occurring six days after rubella. Bronchitis and laryngitis have been observed during the course of rubella, but in such cases these complications existed well before the onset of the eruption and were contracted independently of the rubella but were in no way enhanced by the disease. Indeed, it is safe to say that rubella does not offer any added danger to concomitant infections or pre-existing disease, with the exception of thrombopenic purpura and possibly a latent encephalitic infection.

(To be concluded)

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CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

Weekly Clinicopathological Exercises

FOUNDED BY RICHARD C. CABOT

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CASE 33251

PRESENTATION OF CASE

A twenty-three-year-old single woman entered the hospital complaining of blueness of the hands, face and feet.

No abnormality at birth or in development as a child had been noted, but her mother stated that as a child she had not played with other children very much and had always been "lazy." At the age of twelve a mild, dull pain in the chest, located to the left of the lower portion of the sternum, had been noticed. At that time a bluish discoloration of the face and hands was first observed. There were no associated symptoms that seriously incapacitated the patient, although she noticed that if she exercised as other children she had headaches and became blue and somewhat weak. These symptoms, however, did not prevent her from roller skating and dancing. The pain disappeared promptly, but occasionally thereafter she was aware of a slight, dull pain in the chest, without particular relation to any activity. In addition, she complained that the eyes frequently became "bloodshot" and that the cold aggravated the blueness of the extremities. A gradual clubbing of the fingers from that time was noted. Three years before admission the patient went to a physician with these complaints. She was told that she had a low blood pressure and was given some "pills," which she took without benefit; she did not, however, consider the symptoms severe enough to return. A year later she saw a dentist for bleeding gums and was referred to her physician for a blood examination, which was negative. Fourteen months before entry she attempted to join the WAVES and was told that everything was normal except for blueness, clubbing of the fingers and an abnormal chest film. She was referred by the Navy to a sanatorium, where extensive studies for tuberculosis were negative. At the time of admission the patient complained only of cyanosis and clubbing of the fingers and toes. She felt perfectly well, being able to exercise strenuously without ill effect other than an increase in cyanosis, which she thought had gradually become more prominent.

The past history revealed no serious illness. The patient had had mumps, measles and chicken pox as a child. She had had occasional sinusitis and a chronic morning cough productive of a teaspoonful of sputum. The gums had always bled easily. There was no history of familial disease.

Physical examination on admission revealed a well developed and well nourished girl in no distress. There was a striking cyanosis of the face, hands and feet with severe clubbing of the fingers and toes. The conjunctivas were markedly congested, and examination of the fundi showed extremely dilated veins with tortuous arterioles. The throat was a dusky red. There were no abnormal pulsations in the neck. The chest was clear. The heart was normal in size. The pulmonic second sound was louder than the aortic second sound. No murmurs were heard. One examiner described an inconstant pulmonary systolic murmur. The liver and spleen were not palpable. The extremities showed good pulsations. Neurologic examination revealed a right knee jerk that was less active than the left.

The temperature was 99.6°F., the pulse 80, and the respirations 15. The blood pressure was 100 systolic, 80 diastolic, in the right arm and 95 systolic, 78 diastolic, in the left.

Examinations of the blood showed red-cell counts ranging from 7,100,000 to 8,790,000, with hemoglobins of 21.5 to 24.9 gm., and a white-cell count of 12,000, with a normal differential. The venous blood had an oxygen content of 16.7 and an oxygen capacity of 28.5 vol. per cent, with a hematocrit of 69.7 per cent. The arterial blood had an oxygen content of 24.85 and an oxygen capacity of 27.7 vol. per cent, with a hematocrit of 67 per cent. The oxygen saturation was 89.2 vol. per cent. The circulation time with ether was 11 seconds and with Decholin, 23 seconds. The vital capacity was 3100 cc. Urinalysis was normal. An electrocardiographic tracing was normal.

X-ray examination of the chest revealed an extensive "flecky" area of increased density in the right middle lobe, mainly in the anteromedial segment (Fig. 1). There was also a fine network of increased density in the left lung field laterally that was thought to be in the lingular portion of the left upper lobe. Both leaves of the diaphragm were well defined and showed good motion. The hilar shadows were normal. The heart was normal in size, shape and action. Fluoroscopy showed evidence of pulsations of the major branches of the right pulmonary artery somewhat farther away from the hilus than usual. The finer branches showed no abnormal pulsations. The hands and feet failed to show any evidence of pulmonary osteoarthropathy.

The patient's condition remained unchanged. On the sixteenth hospital day an operation was performed.

DIFFERENTIAL DIAGNOSIS

DR. EARLE M. CHAPMAN: A pulmonary murmur was heard. Does that mean that it was heard over

the lung or in the second left interspace? That is an important observation, and it needs clarification.

DR. RONALD C. SNIFFEN: The record is not clear on that point.

DR. CHAPMAN: May we see the x-ray films?

DR. STANLEY M. WYMAN: The film of the chest shows mottled density lying in the anterior medial segment of the right middle lobe as seen in the anteroposterior projection. It is seen in the lateral view lying in this triangle. There was said to be fine mottling in the lingula of the left upper lobe.

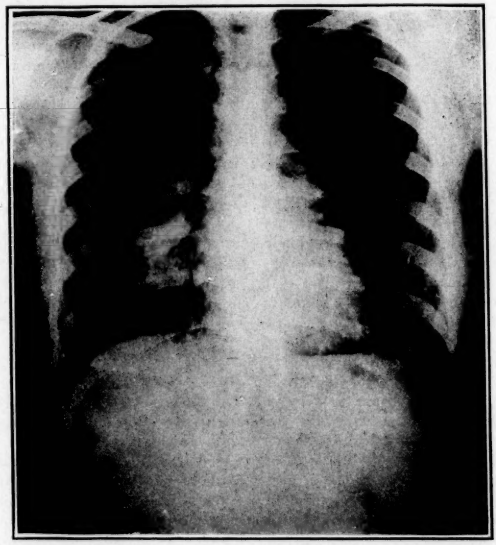

FIGURE 1.

I cannot be sure of that finding. I think it should be noted that there is a rounded, sharply defined shadow extending outward and downward at this point, coming down to this region, which suggests the pulmonary artery. The lateral view of the skull shows no definite abnormality.

DR. CHAPMAN: May I ask if pneumothorax was done and if a further definition of the mass was obtained?

DR. SNIFFEN: Pneumothorax was not done.

DR. CHAPMAN: This case represents a rare clinical syndrome that would not have been correctly diagnosed or treated ten years ago. Indeed, its diagnosis was missed on three occasions during the patient's life. The characteristics are so clearly set forth in this history that I have no hesitancy in making a diagnosis of an arteriovenous fistula of the lung, with secondary polycythemia.

Only two other conditions have to be considered in the differential diagnosis, and they are congenital heart disease and polycythemia vera. The latter is excluded by the failure to find immature white cells or basophilia in the smear. Congenital heart disease is practically excluded by the entirely normal cardiac findings.

This rare disorder is often congenital but possibly traumatic in origin, and yet the few cases reported in the literature since 1938 seem to have established a group of symptoms and signs that should indicate the correct diagnosis. These are cyanosis, clubbing of the fingers and toes, and symptomatic polycythemia usually in a young person with a normal heart and an obscure pulmonary lesion by x-ray study. Some patients have a continuous murmur over the lesion if it is of the cavernous type connecting with the pulmonary artery.

The hazards of continuing with the lesion are that it may rupture and lead to sudden death in pulmonary hemorrhage, such as in the case described by Rodes[1] in 1938, which at autopsy showed three hemangiomas in the right lung and one in the left lung; or the patient may be incapacitated by the symptoms of anoxemia. Such were the

symptoms that led to the first successful removal of the right lung containing such a hemangioma in 1942.

Since then several cases have been successfully operated on, and the patients have lost the cyanosis immediately after operation, the blood counts have returned to normal, and the symptoms have disappeared. Disappearance of the symptoms, however, depends on removal of the entire lesion and the absence of multiple arteriovenous fistulas.

There are some interesting data and clinical points in this case that I think deserve further comment. For instance, the bleeding of the gums and suffusion of the eyes and mouth are clinical signs consistent with a polycythemia, and yet they seem to have been overlooked as diagnostic signs. The pulse rate was slow, and this suggests that the cardiac output was normal, since according to Marey's law, a rapid pulse can be due to a low blood pressure and not to an increased venous pressure.

Having seen the x-ray film I place the lesion in the right lung rather than the left, although it is possible for such a lesion to exist on the left side as well.

Fluoroscopy showed, "evidence of pulsations of the major branches of the right pulmonary artery. . . ." That is why I was concerned with the so-called "pulmonary murmur" and with the decision whether it was a murmur over the heart. The history stated that no heart murmurs were heard and later that a "pulmonary murmur" was heard. To me, that means a murmur over the lungs. This sign has been described in some cases of arteriovenous fistula of the lung.

The oxygen saturation in itself could be a significant diagnostic procedure. The patient had a slightly slow circulation time; with an arteriovenous lung fistula or even in pulmonary congestion one could expect even greater delay in the blood circuit through the lung.

In conclusion, then, I believe that this case is characteristic possibly of a cavernous hemangioma type of arteriovenous fistula of the lung, and I assume that at operation perhaps all or part of the right lung was removed. It would be interesting to hear from others about the subsequent course.

DR. SNIFFEN: Dr. King, have you any comment?

DR. DONALD S. KING: The patient came to the sanatorium with a diagnosis of questionable tuberculosis and was sent to this hospital from there.

DR. JOHN T. QUINBY: I believe that I was the first to see the patient in the Out Patient Department with some of the fourth-year men, and I thought that she had congenital heart disease. I followed her after entry into the hospital. Preoperatively the hematocrit was 67 per cent and the oxygen saturation 89 vol. per cent.

DR. SNIFFEN: Is such cyanosis usual with a not very low oxygen saturation?

DR. QUINBY: As I understand it, the cyanosis depends on concentration of the reduced hemoglobin. With a high total hemoglobin, an unsaturation of 6 or 7 per cent apparently leaves enough reduced hemoglobin to cause a dusky color. Another interesting problem is that the cyanosis and exertion limitation were progressive as the patient grew older, suggesting that the magnitude of the lesion was increasing.

DR. CHAPMAN: I intended to comment on the presence of cyanosis. The oxygen saturation was low, — the normal figure should not be under 95 vol. per cent, and in this case it was 89, representing slight diminution,—but this was compensated for by the polycythemia. In most patients with congenital heart disease when one third of the blood is shunted through from the venous to the arterial side, the reduced hemoglobin goes up from 1 to 4 vol. per cent, and cyanosis becomes established. It is unfortunate that the volumes per cent of reduced hemoglobin were not available.

CLINICAL DIAGNOSIS

Hemangioma of lung.

DR. CHAPMAN'S DIAGNOSIS

Arteriovenous fistula of lung, with secondary polycythemia.

ANATOMICAL DIAGNOSIS

Cavernous hemangioma of right middle lobe of lung.

PATHOLOGICAL DISCUSSION

DR. RICHARD H. SWEET: As Dr. Chapman has said, this is a characteristic entity. The correct diagnosis was made ahead of time in this case by the Medical Department and concurred in by the surgeons. At that time there had been only four or five such cases operated on successfully, at least according to reports in the literature. All of them, I believe, had been pneumonectomies with the exception of one patient of Dr. Janes in Toronto. This case, which was bilateral, was successfully operated on in two stages. The case under discussion was a characteristic so-called "hemangioma," which I prefer to call an arteriovenous fistula. There was one enormous pulmonary artery, probably as large as the whole pulmonary artery should be normally, and there was a corresponding enormous vein, which led out from the middle lobe. In the middle lobe there were numerous dilated vascular channels. So far as I know this is the first case treated by lobectomy alone. Since then, by the way, we have had a similar case — a lesion in the middle lobe — in a child two years of age, who presented the same clinical picture and was cured by surgery. On visiting Dr. Alexander's Clinic in Ann Arbor I recently discovered that there was a third such case with arteriovenous fistula in the middle lobe. It had been thought to be the first

one that had been resected because we had not published our two cases.

Dr. Sniffen: After removal the external surface of the right middle lobe showed a number of small blebs without pleural reaction. Three large vessels entered the lung at the hilus. One of these vessels followed the course of the anteromedial bronchus, and 2 cm. beyond its origin it was broken up into a honeycomb of large anastomosing, vascular channels that occupied an area 9 by 4 by 3.5 cm. in the medial portion of the lobe and accounted for the blebs on the external surface (Fig. 2). The lesion was not encapsulated but showed no evidence of growth. The channels were lined by endothelium, with localized points of subendothelial fibrous thickening.

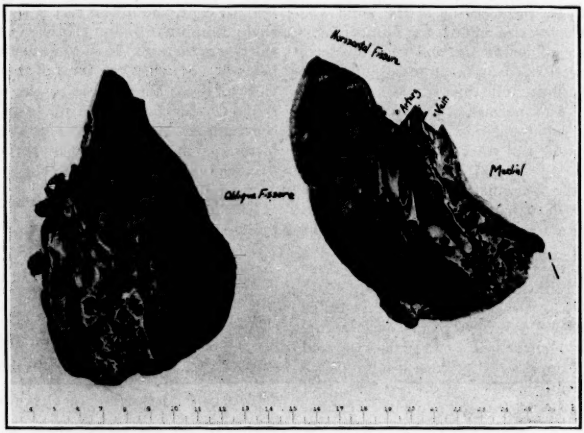

Figure 2.

The postoperative findings are of some interest. Eight days after operation the hematocrit had fallen to 62 per cent, and the oxygen saturation was up to normal. The hemoglobin remained elevated. In the few cases that I have read about, such as the patient studied by Hepburn and Dauphinee,[2] the blood values, including the hemoglobin, had returned to normal in eight days. In the case under discussion about six months elapsed before the hemoglobin and red-cell count fell to normal figures.

Dr. Sweet: Several months after operation the patient showed some reduction in the clubbing of the fingers, and she was no longer cyanotic. I think that one comment is of interest regarding Dr. Sniffen's remark about the rate at which the hemoglobin returns to a normal level. Until this operation was done, — I have not followed the reports in the literature since then, — all the patients operated on suffered alarmingly of exsanguinating hemorrhages on the operating table. I therefore assume that the rapid reduction was due to blood loss. We are sensitive to that, and this patient did not suffer any appreciable loss of blood during the operation. I think that possibly this was responsible for the slow return of the hemoglobin to the normal level.

Dr. Howard B. Sprague: Certainly, in peripheral arteriovenous communication, one would expect enlargement of the heart because of the increased flow. We have to agree possibly to an increase in pulmonary venous pressure. Does it not mean that the right ventricle can stand increased circulation better than the left ventricle? There are so few of these cases that we have not been able to draw a conclusion, but I think that it is of considerable interest that this patient had an increase in flow.

Dr. Sniffen: Another point in reference to Dr. Chapman's remarks: it is stated in the record that the blood examination two years before admission was normal in this case. In Hepburn's case the patient had been followed carefully in a sanatorium, and at that time she had a normal red-cell count and hemoglobin. Only in the last year and a half did the hemoglobin and the red cells increase.

Dr. Sweet: How about cyanosis?

Dr. Sniffen: It was present.

Dr. Sweet: When the blood counts were normal?

Dr. Sniffen: Yes; presumably because of the arteriovenous shunt and before secondary polycythemia had become established.

DR. CHAPMAN: I should suggest that the lesion was expanding in type and becoming enlarged and that the degree of polycythemia was in relation to the size of the shunt. In this case, as the tissues became distended, there was more bleeding. It is an interesting point that Dr. Sprague has made, and one that has been made in other cases. It is surprising how the heart can accommodate itself to this extra load.

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CASE 33252

PRESENTATION OF CASE

A forty-nine-year-old stock clerk entered the hospital because of increasing difficulty in swallowing.

Six years before entry the patient had begun to have attacks of diffuse abdominal pain associated with nausea and vomiting and occurring at any time of the day or night, without relation to meals or to the type of food eaten. A "stomach operation for ulcers" performed at a local hospital had brought considerable relief of symptoms, but he continued to have some epigastric distress and occasional nausea and vomiting despite "ulcer diets." Eighteen months before entry he had a sudden attack of extremely severe abdominal pain, radiating to the right shoulder. He was rushed to a hospital and operated on for "perforated ulcer." The site of rupture was found with difficulty owing to adhesions from a previous rupture. The postoperative diagnosis was "duodenal ulcer." Six months before entry the patient began to complain of food "sticking in the throat" accompanied by a pain in the substernal region that he had never had before. These symptoms gradually increased in severity until three or four months before entry, when he became unable to take solid food except with great difficulty. Two weeks before entry, the patient consulted another physician, who had x-ray films taken and told him that he had a "growth deep in the chest." The dysphagia continued to progress until at the time of entry the patient could take "only coffee"; everything else was regurgitated. He had lost about 25 pounds in the previous three or four months. He was in the habit of taking one or two alcoholic drinks and smoking ten or fifteen cigarettes daily.

Physical examination revealed a thin, pale man who had obviously lost weight. The voice was hoarse. He complained of pressure in the epigastrium, causing discomfort in the midsubsternal region. The heart, lungs and abdomen were clear.

The temperature was 100°F., the pulse 98, and the respirations 35. The blood pressure was 100 systolic, 80 diastolic.

Examination of the blood showed a hemoglobin of 12.2 gm. and a white-cell count of 9100, with 65 per cent neutrophils. The nonprotein nitrogen was 23 mg., and the serum protein 4.6 gm. per 100 cc., and the chloride 94 milliequiv. per liter. A blood Hinton test was negative. The urine was normal.

A barium swallow revealed marked obstruction to the flow of thin barium in the midesophagus, caused by an oval, sharply defined mass, measuring 5 cm. in length. The mass was attached primarily to the anterior and left lateral wall of the esophagus and involved a large part of the wall (Fig. 1). No definite ulceration was seen. Small amounts of barium trickled slowly past the mass, but this was insufficient to fill the stomach for a satisfactory examination of that organ. The stomach appeared irregular in outline, and its folds were markedly swollen. There was no evidence of gastric resection. It was not possible to determine the presence of a gastroenterostomy. The duodenal cap was large and showed a large crater. There was no definite evidence of disease in the chest. The medial wall of the left main bronchus was poorly outlined.

An operation was performed.

DIFFERENTIAL DIAGNOSIS

DR. CHESTER M. JONES: There is a remote possibility of a single diagnosis in this case, but I do not believe that one diagnosis can cover all the symptoms. The diagnosis of duodenal ulcer would explain the symptoms for the first five and a half years before entry. The patient was operated on twice, and ulcer was found. There were symptoms of perforated ulcer eighteen months before entry, with pain in the right shoulder of subphrenic origin; a duodenal ulcer was said to have been found. I suspect that the surgeon merely did a simple closure at that time. I believe that the patient had a duodenal ulcer.

Certain things are not clear about that diagnosis, particularly in relation to the symptoms, which never followed a typical ulcer pattern. The symptom that brought the patient to this hospital was difficulty in swallowing of short duration — six months. He had pain with the difficulty in swallowing, with substernal reference of pain, which is ordinarily accurate and usually localizes the level of the lesion. The fact that there was pain suggests ulceration, because stenosis alone causes fullness and regurgitation rather than pain.

On physical examination the patient had lost weight and the voice was hoarse, indicating at least a possibility of involvement of the recurrent laryngeal nerve, which suggests involvement outside rather than inside the esophagus. If this statement of hoarseness is correct and if the sign was of recent origin it should be taken into serious account. The patient had fever, again suggesting an ulcerating

process or a condition causing some inflammation of pulmonary tissue.

The laboratory data are noncontributory except for a total protein of 4.6 gm. per 100 cc., which I regard as simply the figure that one would expect from starvation.

The x-ray films should be the source of information that will give us the clue to the probable diagnosis. I am not under any delusions about the difficulty of making a correct diagnosis in this sort of case. I do not believe that it is necessary to make a correct diagnosis, and I suggest that what is most important is the decision to make a move to relieve the obstruction; whether or not the diagnosis is correct is entirely beside the point. On the other hand I realize that I am here to try to make a diagnosis, and I should like to register surprise that the x-ray examination as described showed midesophageal narrowing due to an oval lesion, which was sharply defined, measured 5 cm. in length and was attached primarily to the anterior and left lateral wall. No definite ulceration was seen. That certainly suggests that there was not an ulcer, but I do not believe that it absolutely proves it. Small amounts of barium trickled slowly past the mass, and although the examination of the stomach was not entirely satisfactory the organ appeared irregular in outline and its folds were markedly swollen. Whether that means that the x-ray men suggested that the patient had carcinoma of the stomach, I do not know. I should like to see the films. Obviously if a gastroenterostomy had been done six years before entry it was done for insufficient reason. The second operation was a closure, and therefore the x-ray film probably did not show anything diagnostic. The x-ray description is that of a large duodenal cap with a large crater. If there was a crater, there should have been an active duodenal ulcer, and I do not see how one can define it otherwise. Even if the ulcer was active, I do not see how it had anything to do with what was going on in the esophagus.

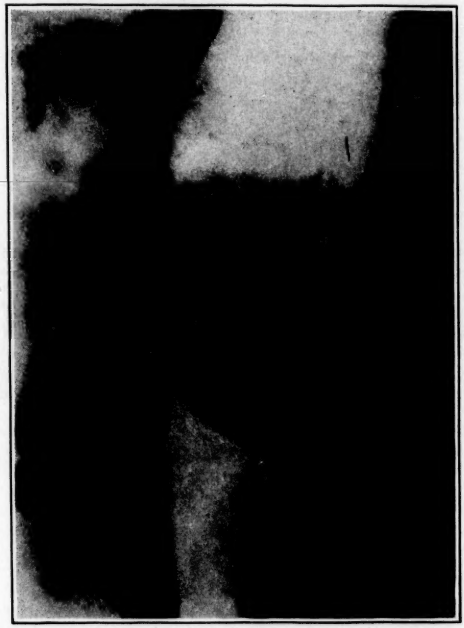

FIGURE 1.

The question arises whether there was an intraluminal tumor involving the esophagus, whether it arose from the wall of the esophagus or whether it was entirely extraluminal, pressing on the esophagus. There is at least a remote suggestion in the last sentence of the x-ray report that the medial wall

of the left main bronchus was poorly outlined; also, the patient was hoarse, which may suggest extrinsic pressure on the left recurrent laryngeal nerve. I might add that I heard Dr. Sweet recently discuss mediastinal tumors, and if I remember the diagnostic batting average from x-ray films was about 10 per cent correct, or 90 per cent incorrect, from the point of view of preoperative diagnosis. Is that right?

DR. RICHARD H. SWEET: Yes.

DR. JONES: I do not expect to do well from the x-ray films.

DR. SWEET: That was a selected group, I might add.

DR. JONES: This case is also selected.

DR. STANLEY M. WYMAN: There is either a crater in the duodenal cap or a pseudodiverticulum from the old ulcer. I did not fluoroscope the patient, but the film is consistent with a crater.

DR. JONES: We have no lateral films here. The trachea is in the midline. There is no displacement of the heart, and I do not know whether there is compression of the left bronchus in that area. Certainly, there is an obvious tumor, which again is interesting because of the magnitude of the defect. But it is not constant, and it seems to me that there is pressure rather than an annular constriction, which one ordinarily sees with an adenocarcinoma of the esophagus. The stomach shows simply a picture of what is ordinarily considered a gastritis with thick rugal folds.

I should say that this was a tumor that was not intraluminal. I do not believe that it was carcinoma of the esophagus. On reading the history my first impression was that of esophageal cancer. I do not believe that the patient had an esophageal ulcer — a lesion that occurs at a lower level. This may have been a tumor arising in the wall of the esophagus with barium coming down on one side. Perhaps it was intraluminal.

DR. WYMAN: In this area the mass presses in on the column of barium, the barium flowing to the right. One must consider a mass arising in the wall of the esophagus as well as something pressing on the esophagus. I do not want to mislead Dr. Jones. Perhaps I have said something I should not have said.

DR. JONES: You apparently helped me, but I need it. The point I make is that wherever one looks here there is evidence of esophageal wall on the right side and not on the left, which suggests compression where the barium runs through. It may arise from the wall of the esophagus itself. If that is the case, I suspect that it would go beyond the outer wall of the esophagus and encroach on the structures out here, possibly involving the recurrent nerve. I shall say that this was an intrinsic tumor of the wall of the esophagus, and I should not be surprised to find it slightly ulcerated.

CLINICAL DIAGNOSIS

Carcinoma of esophagus.

DR. JONES'S DIAGNOSIS

Tumor of esophagus arising from submucosal tissues.

ANATOMICAL DIAGNOSIS

Leiomyoma of esophagus.

PATHOLOGICAL DISCUSSION

DR. TRACY B. MALLORY: Dr. Sweet, will you tell us your findings?

DR. SWEET: Dr. Jones gave an able discussion of this case. We were greatly puzzled by the severity of the symptoms. The x-ray appearance suggested more a benign tumor of the intramural type than a carcinoma of the esophagus. We were prepared from the history, as Dr. Jones has said, to find that the patient had carcinoma of the esophagus, and then the x-ray films puzzled us. We likewise did not make any connection between this and the ulcer. Dr. Richard Schatzki said that although he could not examine the stomach wall, there was something peculiar about the stomach, and he suspected carcinoma of that organ. We thought that the patient might have a carcinoma or lymphoma of the stomach, and we were going to investigate further. That had nothing to do with the esophageal tumor. At operation it looked like leiomyoma.

The tumor bulged through the musculature but it was easily removed locally. A myomectomy was performed. A biopsy had been performed previously in the muscular wall, and there was a point where I had to enter the lumen because the mucosa was so adherent. A portion of mucosa had to be excised with the tumor. I ought to say that it is extremely unusual for benign tumor of the esophageal wall to cause as much obstruction as this patient had.

A PHYSICIAN: Why did he have pain?

DR. SWEET: Because he was so obstructed. The esophagus was almost completely shut off.

DR. MALLORY: Microscopical section showed a spindle-cell tumor, which we diagnosed as benign leiomyoma of the esophageal wall.

DR. JONES: Did the tumor press on any structures outside the esophagus?

DR. SWEET: No.

DR. JONES: What did you do with the stomach?

DR. SWEET: I think we shall take care of that some time soon, if the patient continues to show evidence of neoplasia there.

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STREPTOMYCIN TREATMENT FOR TUBERCULOSIS

It was not long after streptomycin had been shown to have antibiotic activity against a variety of gram-negative and gram-positive bacteria, including *Mycobacterium tuberculosis*,[1] that experiments designed to determine its efficacy in experimental tuberculosis were undertaken. The first preliminary results in guinea pigs, which were reported by Feldman and Hinshaw,[2] indicated that streptomycin was well tolerated in these animals and that, even with the rather small doses and the short course of treatment used, it exerted a striking suppressive effect on the pathogenic proclivities of human tubercle bacilli. In a second series, this group,[3] using somewhat larger doses, obtained results that were more striking, and it was shown that there was a reversal from positive to negative tuberculin sensitivity in more than a third of the successfully treated guinea pigs. These early results were considered to be at least comparable with those that they had previously observed with certain sulfones.

Several months after the first report the same workers[4] made a preliminary report on their first nine months' experience in the treatment of human tuberculosis with streptomycin. The antibiotic was found to exert a limited suppressive effect, especially in some of the more unusual types of pulmonary and extrapulmonary tuberculosis. There was evidence to suggest a temporary inhibition of the multiplication of the organisms, but no rapidly effective bactericidal action could be demonstrated.

In another series of studies with streptomycin in guinea pigs, Smith and McClosky[5] were able to show that the chemotherapeutic effect of streptomycin in less than one twentieth of the maximum tolerated dose was superior to that obtained with oral doses of Promin up to about half the maximum that these animals could tolerate. With a suitable combination of streptomycin and Promin they obtained results superior to any that they had previously observed. Others later found that streptomycin combined with Diasone, another sulfone related to Promin, exerted a synergistic or additive therapeutic effect in the treatment of experimental tuberculosis in guinea pigs.[6] A similar superiority of combined therapy was demonstrated in experimental infections in rats.[7]

At about that time Youmans and McCarter[8] showed that streptomycin exerts a marked suppressive effect in experimental pulmonary tuberculosis of white mice. Youmans[9] also tested five highly virulent strains in vitro and found the lowest bacteriostatic concentration to be between approximately 0.1 and 0.8 units per cubic centimeter, but more than 50 units per cubic centimeter were required to exert a bactericidal action on 0.1 mg. of these organisms.

It was soon demonstrated, however, that tubercle bacilli readily acquire resistance to streptomycin during treatment.[10] Tubercle bacilli isolated from 8 of 12 patients after treatment showed marked resistance; in seven of these eight strains, the re-

sistance had increased five hundred to a thousand times when compared with that of the strains isolated from the patients before treatment. These resistant strains were found to be as virulent for white mice as the original streptomycin-sensitive strains, and such infections were not suppressed by streptomycin.[11]

The most extensive clinical trials that have been reported to date are those of Hinshaw and his associates.[12] The results that they noted in some types of cases were highly encouraging, but certain limitations of therapy also became evident.

Their first 100 patients included 12 with miliary tuberculosis, 9 of whom presented clinical evidence of meningitis. Only 4 of the latter survived, the periods ranging from two to ten months, and they were the only patients in the group to receive intrathecal as well as intramuscular injections of streptomycin. The cerebrospinal fluid returned to normal in only 2 of these cases. One patient who received a six-month course of treatment flared up after an interval of a month, indicating that infection may persist in spite of striking clinical improvement. More significant is the fact that all 4 survivors were left with severe neurologic damage.

Some evidence of improvement was also noted in cases of severe moderately advanced or advanced cases of active and progressive nonsurgical pulmonary tuberculosis. After treatment for two to six months definite roentgenographic improvement was observed in 25 of 32 such cases. In 12 patients there was evidence that pulmonary cavities had closed, but in 6 others thick-walled cavities persisted despite the treatment. Tubercle bacilli disappeared from the sputums of 13 patients, but in 15 others they persisted despite prolonged therapy. There was no demonstrable progression of the lesions in any of the cases. All those that were unimproved had advanced lesions with thick-walled cavities of long standing. In 6 patients reactivation attended the discontinuance of treatment, but 2 of them promptly improved again when the treatment was reinstituted. Five of the patients had died at the time of the report; 1 of them had had a reactivation four months after a course of treatment carried out over a six-month period and failed to respond to another course because the infecting organisms had become resistant.

Ulcerating tuberculous lesions of the respiratory tract, including the larynx, hypopharynx, trachea and larger bronchi, seem to have responded favorably in many cases. Tuberculous empyema, on the other hand, failed to improve following intrapleural injections alone in 4 cases, and only 1 of 3 others showed any improvement from combined intrapleural and intramuscular treatment. In tuberculosis of the genitourinary tract the streptomycin appeared to have only a palliative action and was not considered to be a substitute for surgical measures when indicated.

The dosage that Hinshaw and his associates recommend in adults is from 1 to 3 gm. daily in four or six intramuscular doses. They prefer sterile water as a diluent and use concentrations of 100 to 250 mg. of streptomycin per cubic centimeter. For intrabronchial use or as an aerosol they advise concentrations of 25 to 100 mg. per cubic centimeter, and for intrathecal injections they suggest 100 to 200 mg. in 1 to 5 cc. of cerebrospinal fluid or of physiologic saline solution every twenty-four to forty-eight hours. Prolonged treatment for at least two to four months is required. Untoward reactions, including fever, rashes and otic complications,[13, 14] must be expected. They suggest that further treatment should be denied any patient in whom such complications arise and in whom the prognosis by conventional methods of therapy is good. They believe, however, that these reactions

MASSACHUSETTS MEDICAL SOCIETY POSTWAR LOAN FUND

The Postwar Loan Fund has been set up, and all discharged medical officers who were members of the Massachusetts Medical Society in good standing at the time of their entry into the service may apply for loans from this fund. For further information apply to:

George L. Schadt, *Chairman*
Postwar Loan Fund
8 Fenway
Boston 15, Massachusetts

are usually sufficiently mild to be disregarded in the progressive types of tuberculosis that are not amenable to other therapy. Most important, however, they emphasize that streptomycin is not to be regarded as a substitute for other and proved effective forms of treatment of tuberculosis.

Some preliminary observations by McDermott were summarized in the report of the National Research Council.[15] His results also suggested that streptomycin exerts a definite action on the tuberculous process. This effect was most striking in hematogenous lesions. It was also noticeable in the exudative and moderate advanced type of tuberculosis but was less striking in cases with caseous lesions. Effects on central-nervous-system infections were impressive but not sustained. His more recent results are awaited with considerable interest.

Direct reports from the rather extensive program under way in the hospitals of the Veterans Administration are not yet published. A press release,[16] however, indicates that the early results were favorable enough so that the program was extended to nineteen study units. About three fourths of the patients with pulmonary tuberculosis seem to have shown some improvement. The long-range effects are not yet known, and the incidence of relapses and of the development of resistant strains in this and other groups of cases will be helpful factors in determining the broader usefulness of streptomycin in pulmonary tuberculosis.

In the meantime variable results have been reported in isolated cases or small groups of cases of tuberculous meningitis in addition to those already mentioned. There was recovery, with apparent improvement in the neurologic findings, among 3 of 9 such cases.[17–19] The use of streptomycin for prolonged periods seems indicated for cases of tuberculous meningitis and may be expected to yield some favorable results provided that treatment is given intrathecally and intramuscularly and that there are no coexisting caseous pulmonary or extensive intracerebral lesions.

From the point of the community as a whole, it is probably wise at present to limit the use of streptomycin entirely to the few clinics where carefully controlled and prolonged treatment and study are possible. Only on the basis of the results in such controlled groups of cases may one expect to determine the real and permanent value of streptomycin in the various forms of tuberculosis and to recommend a nation-wide program for its use in individual cases and in groups of cases. General hospitals are not at present equipped to handle this problem and should not be expected to do so, and it is still too soon even to recommend a long-range program for specialized institutions. In the meantime it is hoped that more effective, less expensive and less toxic agents will become available, particularly ones with which the development of bacterial resistance is not such a prominent feature.

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SURGICAL TRAINING

CERTAIN aspects of the future of postgraduate surgical training are brought out in a letter published elsewhere in this issue of the *Journal*. The problem is only another one of those that have been raised by a rapidly changing socioeconomic order and that have recently called forth many letters and editorials in medical periodicals. Adequate medical and nursing care, a sufficient number of hospital beds and efficient graduate training of all types have received consideration, but it is often difficult to decide which is the cart and which is the horse.

The correspondent points out that the so-called "ward beds" in the teaching hospitals are, for various reasons, becoming fewer and fewer and that the opportunities for the proper surgical training of interns and residents are consequently becoming poorer and poorer.

There is no doubt that the numbers of ward beds are lessening, and this will undoubtedly continue as various types of insurance covering hospital and medical care increase in popularity. The situation is further complicated by the fact that ward-plan subscribers to the Blue Cross who are also subscribers to the Blue Shield should rightfully be operated on by a participating surgeon rather than by a member of the house staff. Although it is acknowledged that, in the interest of surgical training, by far the majority of ward patients in the large teaching hospital should be operated on by members of the resident staff, it is obvious that this is becoming increasingly difficult.

Another problem concerns the young surgeons who have completed their residencies and who, unfortunately for themselves and for the communities in which they are needed, elect to remain in the large teaching hospitals. In such institutions these men are on service for periods of several months during the year, but if they are fair to the resident staff, "handing down" the bulk of the operative work, they get little return in practical experience from the amount of time that they devote to the hospital. On the other hand, the young surgeon who has had four or five years of active, well supervised training fares little better if he goes to a community hospital, unless he is fortunate or wise enough to choose a locality in which there is real need for a surgeon. As a rule, his operative surgery is limited to what comes his way in private practice.

These trends appear to be inevitable, and it seems obvious that the present system of postgraduate surgical training will not suffice and that it has a tendency to disrupt an equitable distribution of surgeons. Too few opportunities are available for postgraduate training; furthermore, too many well trained young surgeons remain in the large teaching centers, partly because little incentive is offered for moving to smaller communities. Three possibilities as a means of relieving the situation are available — more widespread adoption of the fellowship or preceptorship as a method of surgical training, the development of community hospitals as teaching centers, and subsidization of the young surgeon who locates in a small community. Other schemes will undoubtedly be devised as the necessity arises. Certainly, efforts should be made to meet the demand not only for an increasing number of well trained surgeons but also for their equitable distribution throughout the country.

MASSACHUSETTS MEDICAL SOCIETY

DEATHS

CRABTREE — E. Granville Crabtree, M.D., of Brookline, died May 30. He was in his sixty-fourth year.

Dr. Crabtree received his degree from Harvard Medical School in 1914. He was urologist at the New England Baptist and Beth Israel hospitals and consulting urologist at the Newton-Wellesley Hospital. He was a former president of the New England Urological Association and was president-elect of the American Urological Association. He was a member of the American Association of Genito-Urinary Surgeons, New England Obstetrical and Gynecological Society and New England Surgical Society and a fellow of the American College of Surgeons and American Medical Association.

His widow, a daughter and two sons survive.

GARFIELD — Walter T. Garfield, M.D., of Belmont, died May 31. He was in his sixty-sixth year.

Dr. Garfield received his degree from Harvard Medical School in 1909. He was emeritus professor of dermatology at Tufts College Medical School and was a member of the staff of the Boston City Hospital. He was chief of the Outpatient Clinic, Cambridge City Hospital, and consulting physician at the Norwood and Long Island hospitals. He was a member of the American Academy of Dermatology and Syphilology and a fellow of the American Medical Association.

His widow, two sons, a sister and three brothers survive.

MUSSO — George H. Musso, M.D., of Lynn, died March 1. He was in his seventy-third year.

Dr. Musso received his degree from New York University Medical College in 1898. He was administrator of the Union Hospital, Lynn.

CORRESPONDENCE

THE FUTURE OF POSTGRADUATE TRAINING IN SURGERY

To the Editor: It must be apparent to all concerned with postgraduate surgical training that serious threats are arising to endanger the system as it exists today. Perhaps this system is not a desirable one, but its products have certainly brought an enviable reputation to American surgery throughout the world. Whereas gradual changes for the better should be a natural process of evolution in any system, it is envisaged that future changes for the worse are in store for this particular branch of postgraduate training.

The components that make up a well balanced surgical training program should give a man the opportunity to become familiar with the various preoperative and postoperative measures that are the most acceptable for any particular situation that may arise. He should have the opportunity to enter investigative work and to attend clinics and teaching sessions that are ably directed and designed to inculcate the principles of surgical anatomy, physiology and pathology. A pupil under such a well balanced program should become adept in handling patients and should become familiar with and able to execute various technics and maneuvers concerned with diagnosis and treatment.

One feature deserves special emphasis, since it should constitute a part of every program designed to produce a well trained surgeon. It is the *sine qua non* and at the same time the *bête noire* of all those seeking surgical training today. It is a feature with which training programs in medicine and its various specialties are not confronted to such a serious degree. This is the opportunity for a man to do various surgical procedures *himself*, under proper guidance. If this opportunity is lacking, failure is a certainty, no matter how well thought out and directed all other parts of the program may be.

This feature of surgical training aids both the surgeon and the patient. It benefits the surgeon in giving him a well rounded training, confidence in himself, coolness under trying situations and that intangible something called "judgment," which is the product only of experience. It benefits the patient by giving him expert surgical attention at a low cost. A young surgeon in training, with a good fundamental background, operating daily on major cases, will probably perform more ably in the average operation than the older surgeon who operates on the occasional patient in private practice. The former is subjected to closer scrutiny and to greater criticism, and this offers considerable stimulus to the average conscientious intern or resident.

Great upheavals in the social system of the world, and of this country in particular, are in progress. One of these is concerned with the redistribution of the wealth. One hears, and reads in various journals and newspapers, of socialized medicine, the Wagner–Murray–Dingell Bill and various insurance plans designed to raise the standard of medical care. The attempt of organized medicine to keep bureaucracy, political pilfering and graft from its doorstep is the natural reactionary development to many of these proposals.

It is quite doubtful that anyone could marshal an effective argument against the general ideas embodied by the Blue Cross today. Unquestionably, a great need was fulfilled by the development of this plan. What it may lead to, however, is another thing. Certainly, no business should be allowed the power to dictate policies that are not in the best interests of the medical profession.

There has been a noticeable trend in recent years of an increasing demand for private beds and a coincidental lessening of the demand for ward care. This is due to many factors, such as an increased national income, changes in the distribution of income and the growth of insurance plans. Some institutions have been forced to close off varying numbers of ward beds owing to a shortage of nurses, which is related in part to some of the aforementioned factors. Increased operational costs for hospitals have almost doubled the rates for ward care. The clamor for more private beds grows louder daily. In fact, at the present time, a plan is even being considered by which private patients would occupy ward beds. It is said that the objective of certain advocates of socialized medicine is to have multiple group practices, which would be financed by the state, with the assistance of federal grants. All patients under the care of such groups would be on a private or semi-private status.

The term "ward beds" is used in reference to beds occupied by patients in a teaching institution under the care of the house and visiting staffs. No professional fees are paid by these patients. These beds are not necessarily free, although in some instances they are. If these beds are to be occupied more and more by private patients and those benefiting from employer's insurance, Blue Cross and the like, what beds are to be employed for teaching purposes? A possible answer is the fellowship system, which is used in various clinics throughout the country. This has a definite and highly useful place in graduate surgical training. The time for this type of training, however, is after a certain amount of fundamental and operative experience has been obtained, so that the various diagnostic and therapeutic technics executed by the highly trained surgeons in these great centers can be appreciated. It has been said that no matter how long one watches a great artist playing the piano, one can gain proficiency only by long hours of practice. The combination of watching and doing is the ideal one.

As the ward beds are encroached on by private cases, there will be fewer and fewer cases under the care of the house staff. Coincidentally, more and more men desire longer training, stimulated by the requirements of the American College of Surgeons and American Board of Surgery. Thus, the problem of adequate training for the young surgeon becomes increasingly difficult. No one will deny that increased training is a desirable thing, but where are the beds to train so many for so long? That would be difficult to answer in any event, but with the increasing shortage of ward beds it will become even more so.

The answer to these questions must be forthcoming soon. There are answers. The questions are not insoluble.

G. P. Whitelaw, M.D.
Massachusetts Memorial Hospitals
750 Harrison Avenue
Boston 18

BOOK REVIEWS

Peptic Ulcer: Its diagnosis and treatment. By I. W. Held, M.D., and A. Allen Goldbloom, M.D. 8°, cloth, 383 pp., with 110 illustrations. Springfield, Illinois: Charles C Thomas, 1946. $6.50.

This monograph is unusual chiefly because it has been put together by two broadly trained internists who do not claim to be gastroenterologists. It presents a pleasant and easily readable account of peptic ulcer and its vagaries.

The general architecture of the book is along modern lines. The first chapter deals with the pathogenesis of ulcer, the second with pathology, the third with symptoms, and so on down to a discussion of the complicated ulcer and the indications for surgery — without mention, incidentally, of vagotomy.

The authors have been industrious; at the end of each chapter is a list of reliable bibliographic references, their illustrations are well chosen, and their literary style is plain and simple. Captain Herman Schildkrout — another internist without professed gastroenterologic leanings — has supplied a chapter entitled "Dyspeptic Soldier," which discusses functional indigestion with a fair degree of adequacy.

On the whole, the volume is simple and unpretentious. It makes no claim to educate the highly specialized specialist. Yet it is likely to prove a comfortable vehicle of information to the readers for whom it was written — the busy physician in general practice and the medical student who is preparing for tomorrow.

Lippincott's Quick Reference Book for Medicine and Surgery: A clinical, diagnostic, and therapeutic digest of general medicine, surgery and the specialties, compiled systematically from modern literature. By George E. Rehberger, M.D. Thirteenth edition. 4°, cloth, 1461 pp., with 302 illustrations. Philadelphia: J. B. Lippincott Company, 1946. $15.00.

This popular, standard reference book, first published in 1920, has been thoroughly revised for this thirteenth edition. The sections on obstetrics, skin, eye, ear, nose and throat have been rewritten. Emphasis is placed on the clinical aspects of medicine. Part eleven consists of a large valuable alphabetical list of drugs with their dosage, solubility, method of administration, physiologic and toxic action and therapeutic indications. There is also a pharmacologic index arranged by classes of drugs, as well as a comprehensive

index of subjects. The volume is well adapted for quick reference and is suitable for public libraries. It is well printed in two columns, with a good type on good paper, and is substantially bound.

Practical Malariology. Prepared under the auspices of the Division of Medical Sciences, National Research Council, by Paul F. Russell, M.D., M.P.H., Luther S. West, Ph.D., and Reginald D. Manwell, Sc.D. 8°, cloth, 683 pp., with 238 illustrations. Philadelphia: W. B. Saunders Company, 1946. $8.00.

Raymond B. Fosdick, of the Rockefeller Foundation, in the foreword of this volume, describes malaria as "a stubborn disease, slow to kill, quick to incapacitate and hard to cure." This book is a balanced and authoritative study presenting the varied and complex problems of malariology and setting forth the newer knowledge about this widespread disease. The experience and judgment of the authors are reflected in the thorough and competent treatment of every phase of the subject. Dr. Russell has devoted approximately twenty years to the study of this disease in numerous highly malarious areas of the world.

The clinician will find a concise description of the disease and the newer dosage schedules for prophylaxis and treatment that were developed during World War II. The new antimalarial drugs, chloroquine and paludrine, are also mentioned, along with the information available about results and usefulness at the time the book went to press. A short chapter on therapeutic malaria in the treatment of general paresis is given.

Since the specific diagnosis of this disease depends on the demonstration of parasites in the blood, the laboratory technician will appreciate the thorough descriptions of human and also animal species of plasmodia. Excellent colored plates of stained human malarial parasites in both thick and thin films are included. Technical methods for staining, preserving and culturing parasites are given, and procedures for handling, rearing and identifying mosquitoes are presented in detail.

After reading the thorough sections on epidemiology and control of the disease and its anopheline vectors, the reader will have no illusions about the simplicity of malariology. Nevertheless, the community and technical problems of malaria control, the methods of attack and the results to be expected from control measures are applicable to a wide variety of malaria situations. The methods given for mosquito control and for drainage and filling of breeding places will be useful to public-health officers and sanitary engineers who are responsible for the general control of mosquitoes as pests, as well as for their eradication as vectors of malaria in endemic areas.

This volume is what the title indicates — a practical manual for use in the clinic, in the laboratory and in the field for the diagnosis, prophylaxis, treatment, control and study of malaria.

Handbook of Neurological Examination and Case Recording. By D. Denny-Brown, M.D. 12°, paper, 112 pp. Cambridge: Harvard University Press, 1946. $1.75.

This brief manual is useful for house officers and students in a neurologic clinic. Since many manuals of a similar nature are available, it seems hardly necessary to add a new one. All the material contained in it is readily available in standard textbooks on neurology, where it should be. Although this book is sound, the need for it appears to be slight.

Operative Gynecology. By Richard W. TeLinde, M.D. 8°, cloth, 751 pp., with 309 illustrations and 9 color plates. Philadelphia: J. B. Lippincott Company, 1946. $18.00.

This admirable textbook of operative gynecology is wholly in the best Hopkins tradition and derives lineally from the pioneer work of Howard Kelly. In a series of thirty-eight chapters, the author describes succinctly and with utmost clearness all the classic gynecologic procedures and a large number of new operative technics, most of which he has himself devised. Each chapter is followed by a brief but expertly selected bibliography of references to the literature. The work is copiously illustrated with original drawings in black and white and fifteen subjects in full color on nine plates. The merit of the text is matched by that of the illustrations, the majority of which are by James Didusch and the late Max Brödel. From every standpoint this is an exceptional book, which may be unhesitatingly pronounced the finest of its class to date.

Their Mothers' Sons. By Edward A. Strecker, M.D., Sc.D., Litt.D., LL.D. 8°, cloth, 220 pp. Philadelphia: J. B. Lippincott Company, 1946. $2.75.

Some of the major issues with which psychiatrists concern themselves in their practice and study continue to be as baffling now as they were when man first surveyed man with the aim of improving his social condition and personal welfare. But much knowledge is being accumulated, and many wise persons are drawing their own conclusions about the material with which they work in this field.

One of these is Dr. Edward A. Strecker, who has spent the greater part of his life treating maladjusted patients and studying their problems. He has synthesized one of the results from this lifetime of labor into a simple formula that anyone can understand. It is the three letter word "Mom," first emphasized by Mr. Philip Wylie, but now given by Dr. Strecker the full stature and strength required to make it a living concept. Alfred Adler is reported to have said, "Children are the victims of their incessant mothers and their infrequent fathers." Perhaps this explains why Dr. Strecker fixes the blame on Mom instead of Pop. At any rate, the result of her sins of commission is the same as his sins of omission — an inadequate or maladjusted person who cannot work or fight and who seems incapable of learning to be a happy and useful citizen.

If anyone is an authority on this subject it is Dr. Strecker. He has practiced psychiatry in Philadelphia for years. He has dealt as a consultant with psychiatric problems in the Army and Navy. In the course of his work Dr. Strecker has made prolonged and minute investigations of countless cases. In all this, he has been profoundly impressed by the relationship of the mother and child and its effect on the child's performance and accomplishments later in life. Starting with an absolutely open mind or perhaps with an inclination to favor the interests and influence of the mother, Dr. Strecker concludes that at least one type of neurotic life pattern is due more to her than to anybody else. After reaching this conclusion, he devotes a great part of this extraordinary book to a description of what a Mom is and is not and to a detailed analysis of what such mothers do to their children and how they do it. This book is a self-administering text, by means of which any woman who suspects herself of being a Mom can soon find out the awful truth one way or the other. Dr. Strecker even goes farther and gives the reader some indication of what to do about it. For once and for all, Dr. Strecker presents a new and dynamic concept that is already proving useful in home and school, where the danger of Momism is greatest.

This book will also be helpful to the physician who has a Mom to deal with. At least it will provide information in terms of Dr. Strecker's analysis. One question that comes up is, "What is a Mom?" The answer, according to this book is, "Mom is a mixed up mother who mixes up her child." This mix-up can occur anywhere along the line, but it may occur early and is usually maintained throughout the years when the child is in closest touch with the mother and most receptive to the impression of unfavorable as well as favorable features of her personality. Some would call it a vitriolic book. Perhaps it is. It is a book that may jolt some mothers into seeing themselves as others see them — particularly psychiatrists. But it is certainly *not* a book to give as a present on Mother's Day. Dr. Strecker should write a companion volume on Pop.

BOOKS RECEIVED

The receipt of the following books is acknowledged, and this listing must be regarded as a sufficient return for the courtesy of the sender. Books that appear to be of particular interest will be reviewed as space permits. Additional information in regard to all listed books will be gladly furnished on request.

Tutoring as Therapy. By Grace Arthur, Ph.D. 8°, cloth, 125 pp. New York: Commonwealth Fund, 1946. $1.50.

Parenteral Alimentation in Surgery: With special reference to proteins and amino acids. By Robert Elman, M.D., associate professor of clinical surgery, Washington University School of Medicine. 8°, cloth, 284 pp., with 31 figures and 21 tables. New York: Paul B. Hoeber, Incorporated, 1946. $4.50.

Devil by the Tail. By Langston Moffett. 8°, cloth, 431 pp. Philadelphia: J. B. Lippincott Company, 1947. $3.00.

Manual of Diagnostic Psychological Testing. Volume II. *Diagnostic Testing of Personality and Ideational Content.* By David Rapaport, Ph.D.; and Roy Schafer, B.S. With the collaboration of Merton Gill, M.D. 8°, paper, 100 pp., with 12 illustrations and 5 tables. New York: Josiah Macy Foundation, 1946.

Cardiovascular Diseases. By David Scherf, M.D., associate professor of medicine, New York Medical College, Flower and Fifth Avenue Hospitals; and Linn J. Boyd, M.D., professor of medicine, New York Medical College, Flower and Fifth Avenue Hospitals. 4°, cloth, 478 pp., with 56 illustrations. Philadelphia: J. B. Lippincott Company, 1946. $10.00.

Your Rheumatism and Backaches. By Joseph D. Wassersug, M.D. 8°, cloth, 254 pp. New York: Wilfred Funk, Incorporated, 1947. $2.50.

Scientists Against Time. By James Phinney Baxter, 3rd. 8°, cloth, 473 pp., with 74 illustrations. Boston: Little, Brown and Company, 1946. $5.00.

The American Hospital. By E. H. L. Corwin, Ph.D. 8°, cloth, 226 pp. New York: The Commonwealth Fund, 1946. $1.50. Studies of the New York Academy of Medicine, Committee on Medicine and the Changing Order.

The Centennial of Surgical Anesthesia: An annotated catalogue of books and pamphlets bearing on the early history of surgical anesthesia. Exhibited at the Yale Medical Library, October, 1946. Compiled by John F. Fulton, M.D., and Madeline E. Stanton, A.B. 8°, paper, 102 pp., with 8 facsimiles and one portrait. New York: Henry Schuman, 1946. $4.00.

Victory Over Pain: A history of anesthesia. By Victor Robinson, M.D. 8°, cloth, 338 pp., with 17 illustrations and 30 plates. New York: Henry Schuman, 1946. $3.50.

White Caps: The story of nursing. By Victor Robinson, M.D. 8°, cloth, 425 pp., with 24 illustrations. Philadelphia: J. B. Lippincott Company, 1946. $3.75.

Health Insurance in the United States. By Nathan Sinai, Dr. P.H., Odin W. Anderson, and Melvin L. Dollar, School of Public Health, University of Michigan. 8°, cloth, 115 pp. New York: The Commonwealth Fund, 1946. $1.50. Studies of the Committee on Medicine and the Changing Order of the New York Academy of Medicine.

The Second Forty Years. By Edward J. Steiglitz, M.S., M.D. With a foreword by Anton J. Carlson, A.M., Ph.D., LL.D., M.D., Sc.D. 8°, cloth, 317 pp., with 18 figures. Philadelphia: J. B. Lippincott Company, 1946. $2.95.

Techniques and Procedures of Anesthesia. By John Adriani, M.D., director, Department of Anesthesia, Charity Hospital of Louisiana, and clinical assistant professor of surgery (anesthesiology), Louisiana State University. 8°, cloth, 404 pp., with 123 illustrations. Springfield, Illinois: Charles C Thomas, 1947. $6.00.

Therapeutic Exercise. By F. H. Ewerhardt, M.D., assistant professor of physical medicine, Washington University School of Medicine and Barnes Hospital, St. Louis; and Gertrude F. Riddle, B.S., R.N., R.P.T., instructor, School of Physical Medicine, St. Louis University School of Nursing. 8°, cloth, 152 pp. Philadelphia: Lea and Febiger, 1947. $2.50.

Whither Medicine: From dogma to science? By Antony Fidler, M.D., docent (associate professor) of medicine, University of Warsaw, and senior lecturer in medicine, Polish School of Medicine, Edinburgh. 12°, cloth, 115 pp. Edinburgh: Thomas Nelson and Sons, Limited, 1946. 6 sh.

Aphasia: A guide to retraining. By Captain Louis Granich, Medical Administration Corps, A.U.S. With an appendix in collaboration with Sergeant George W. Pangle, Medical Department, A.U.S. 8°, cloth, 108 pp. New York: Grune and Stratton, 1947. $2.75.

The Journals and Letters of the Little Locksmith. By Katharine Butler Hathaway. 8°, cloth, 395 pp., with 17 illustrations by the author. New York: Coward-McCann, Incorporated, 1946. $3.75.

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